Fish

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From: Kate Faulkner
National Park Service
805-271-4848
Kate_Faulkner@nps.gov

Title: **Recover fish populations and fishing opportunities at the Northern Channel Islands through protection, evaluation, and interpretation of newly established Marine Protected Areas**

Project Description:

Unsustainable fishing has caused declines in fish populations at the Channel Islands and resulted in the closing or severe restriction of many recreational fisheries. Newly established Marine Protected Areas (MPAs)at the Channel Islands provide an opportunity to rebuild fishery-depleted populations, restore integrity and resilience of kelp forests, and provide enhance fishing opportunities outside of the MPAs. MPAs have been shown to enhance fishing outside of reserves by providing areas where fish can grow to larger sizes and have greatly enhanced reproductive capacity. For the MPAs to achieve this goal we must a) enforce the MPA regulations, b) educate the public about the MPAs and c) monitor the biological changes inside and outside of the MPAs. This project would be a cooperative effort between the NPS, NOAA, CDF&G, universities, fishers and others.

MONTROSE RESTORATION PROPOSAL

CONTACT INFORMATION

Principal Investigator: Mark A. Drawbridge
Co-Investigators: Donald B. Kent and Michael A. Shane

Address: Hubbs-SeaWorld Research Institute
2595 Ingraham Street
San Diego, CA 92109

Email: mdrawbr@hswri.org
Phone: 619-226-3943

PROJECT TITLE

Supplementation of contaminated nearshore fisheries with cultured fish in the area affected by the Montrose Chemical Plant.

PROJECT CONCEPT AND BACKGROUND

Project Goals. The primary goal of this project is to use hatchery releases of endemic fishes to directly restore fishing opportunities to recreational, commercial and subsistence fishermen in the Montrose Contamination Area (MCA), in Torrance, CA. Hatchery fish can be released at or near legal size limits when size limits apply. This approach provides the only alternative that would assure fishermen that their catches are not tainted by continued food-web contamination in the MCA. By marking the fish prior to release, fishermen will know precisely what the health risks posed by their catches are. A secondary goal of this project is to involve fishermen in the culture process, thereby vesting them in the program and facilitating the dissemination of information regarding the status of affected resources.

Species selection. The primary species of focus in this project will be the California halibut. In the first two years of the project, other species will also be evaluated for their suitability to the goals of this project. These species would include but not be limited to kelp bass, California sheephead and white croaker. The California halibut was selected as the primary target species for a number of reasons: 1) California halibut are fishermen's most prized food fish endemic to the MCA; 2) although California halibut are bottom-oriented, they feed primarily on pelagic, schooling fishes that are much less likely to be contaminated than other forage fishes, and 3) Hubbs-SeaWorld Research Institute (HSWRI) has been very successful in culturing California halibut and currently maintains broodstocks at both of its laboratories. In addition, HSWRI has conducted field surveys, and tagging and tracking studies of this species.

Background. Since 1983, researchers from HSWRI and San Diego State University have been evaluating the culture potential of white seabass as part of an experimental stocking program - the Ocean Resources Enhancement and Hatchery Program (OREHP). The

OREHP is administered by the California Department of Fish and Game (CDF&G), and supported through the sale of sport and commercial fishing licenses. To support stock enhancement and other mariculture research, HSWRI currently operates a marine research laboratory on Mission Bay, a marine fish hatchery in Carlsbad, California, and a floating ocean cage system off Santa Catalina Island. Institute scientists also coordinate ten volunteer-based growout facilities that are associated with the OREHP and are located in harbors from San Diego to Santa Barbara, California.

HSWRI currently maintains broodstock populations of white seabass, California sheephead, California halibut, lingcod, bocaccio rockfish and California yellowtail at one or more of three facilities. Of these, all have spawned successfully except the bocaccio and lingcod, which were collected only recently. The HSWRI laboratories and field station that house these fish are unique in their locations and levels of sophistication. Each laboratory has a state-of-the-art, computer controlled seawater supply system that provides a reliable supply of filtered seawater. The laboratories have the capability of sterilizing and controlling the temperature of the seawater for their indoor culture systems. The research proposed here would be conducted at the HSWRI facility in Carlsbad, CA, which has the greatest infrastructure and represents the only production-scale marine finfish hatchery in California.

MONTROSE RANKING FACTORS

1) Geographic location of project site. This project will release cultured fish directly into coastal waters of the MCA. Project assessment work (tracking and field sampling) will also occur in this area. Production of juveniles for release will occur at one of several locations. Broodstock are maintained at each of our laboratories in Carlsbad and San Diego. Larval rearing and juvenile production would be conducted at one of those two sites – both have excellent infrastructure to support the work. Growout of juveniles to release size will be conducted by new and existing volunteer-based groups in the Orange and Los Angeles Counties. Fish grown to release size outside the impacted area would be transported to that area for release.

2) Determination of how projects located outside the Southern California Bight benefit injured resources and/or lost services (bald eagle, peregrine falcon, marine birds, recreational and subsistence fishing, and the habitat and resources upon which they depend) in the Southern California Bight. N/A

3) Degree of benefit to natural resources and/or the public if the project is implemented. This project will provide direct, significant benefit to the natural resources and the public by supplementing localized fish stocks (that may or may not be contaminated) with cultured fish that are known to be free of contaminants. The natural resources will benefit by having an infusion of "clean" fish added to the natural food web. The public will receive the greatest benefit by having access to identifiably "clean" fish to catch and eat.

4) Lag time before project benefits are realized (e.g. 0-3 years, 3-5 years, 5-10 years, ≥10 years). Benefits of this project to the natural resources will be realized

immediately as uncontaminated fish are added to the ecosystem. The benefits to the public will be 2-3 years from the start of the program depending on the growth rate of each species cultured and the associated time it takes to reach legal size.

5) Duration of benefits after they become measurable (e.g. >50 years, 30-50 years, 10-30 years, 5-10 years, <5 years). The duration of the benefits of this project will depend on how the supplementation program is managed into the future. The scenario that presents the least risk to the fishermen and consumers is to stock the area with uncontaminated fish several times each year for as long as natural populations remain contaminated and present a health risk to fishermen. Under this scenario, the duration of the benefits would be indefinite.

6) Description of key elements of the project (construction, operation, maintenance) and how success could be monitored/determined. The key elements of this project are outlined below.

   a) *Culture.* This project would involve operation of marine fish culture facility to spawn and raise target species for release. The culture requirements for some potential target species are known, for others R&D would be required. Infrastructure support at HSWRI is already in place to begin the work, only additional culture systems (i.e. pools) would be required to increase current production capacities. Growout of juveniles would be conducted at new and existing growout facilities that are participating in the OREHP white seabass stocking program. Construction of a new facility in Long Beach Harbor would be beneficial to support release logistics and regional education.

   b) *Tagging and tracking.* As part of this project all fish would be marked internally with a coded wire tag, and externally with a tag that is visible to the fishermen. The internal tag would allow long-term tracking of project performance (e.g. movements and survival), while the external tag would provide short-term (< 2 years) identification of cultured (uncontaminated) fish. External tags would be coded in such a way that fishermen (and scientists) would know the release class (i.e. year of release) of fish and therefore, the period at liberty and associated potential for post-release contamination. A tracking program using sonic tags would be implemented during the first 3-years to determine the movement patterns of fish in and around the MCA. Of particular importance is to determine the likelihood that fish released into the MCA would remain there. HSWRI researchers have extensive experience with each of these tagging and tracking techniques.

   c) *Releases.* In the first three years of this project, fish would be tagged, released and monitored in such a way that release strategies are optimized. This includes understanding the best stocking densities, size of fish and seasonal patterns to maximize survival. To achieve this objective, replicate batches of fish will be tagged with unique codes for each treatment and then field surveys will be conducted to determine relative rates of post-release survival.

d) *Assessment.* Project performance will be assessed using a variety of techniques. All fish will be marked with coded wire tags so that rates of mortality (natural and fishing) can be determined quantitatively.

Fishery-independent surveys will be conducted using appropriate gear types (e.g. trawls, gillnets) for the target species, also cooperating with existing fish surveys to every extent possible. These surveys will target subadult and adult fish, as appropriate, to understand short-term stocking dynamics. HSWRI has extensive experience and the necessary permits to conduct these types of surveys.

Fishery-dependent surveys will be conducted by sampling fish at recreational landings, piers and jetties, and commercial markets. HSWRI has an ongoing survey program like this to support its white seabass enhancement program. The Long Beach and Palos Verdes areas are important, well-established sampling areas because of the abundance of seabass caught there and also brought in from Catalina Island.

A bioeconomic model will be developed in the first year and refined as data is collected. This model weighs the costs of culture and rates of survival for a given size class against fishery catch rates and associated value. Through this process, it is possible to identify an optimum size at release where the most "bang-for-the-buck" is realized. HSWRI has a bioeconomic model developed for its white seabass enhancement program that can be readily modified for this project.

7) Whether the method of project implementation has been tested before, and if so, whether it was successful elsewhere. Although stock enhancement in the marine environment (open system) has a long history, early attempts were limited by technology in two critical areas. First, scientists were unable to raise fish past the yolksac stage because they did not have mass culture technologies developed for live feeds. Secondly, scientists did not have the necessary tools to mark their animals prior to release so they could subsequently be identified. These limitations no longer exist and programs that have fully implemented the tools described above have demonstrated success in some but not all cases. Marine stocking programs are typically "put and grow" or "put-grow-and-take" operations that release large numbers of relatively small (3.0 – 7.0 cm) fingerlings.

Recent studies in Japan reported at international scientific symposia suggest that Japanese flounder, a close relative to the California halibut, survive well to market size. As many as 25% of the Japanese flounder released into the coastal waters of Japan appear in the fish markets adjacent to the areas where the fish are released. These results portend that a similar program in the MCA would likely prove successful.

Because fish released into the MCA may become contaminated over time, this project will evaluate the economic feasibility of releasing fish that are at or near legal size whenever size limits apply and "pan" sized fish when there are no size limits. This will minimize the likelihood of post-release contamination. This project will also focus on species that are not expected to travel great distances, further increasing their chances of being caught by fishermen in the MCA. Using this methodology, this

proposed project more closely models "put-and-take" fisheries that are so successful in freshwater systems around the world.

8) How and whether performance could be measured. As indicated above, a key element to this proposal is a comprehensive evaluation of the performance of the MCA fish restoration program. All fish released into the MCA will be tagged and some will be tracked. Marking methods will allow short and long-term evaluation of success, including survival in the wild and harvest rates. Natural and fishing mortality rates will be used in a bioeconomic model that generates cost-to-benefit analyses for different operating scenarios (e.g. size and number of fish released).

9) Whether any extenuating factors could affect the potential success of the project (e.g. DDT and/or PCB contaminated food resource, engineering challenges, exotic species, human disturbance, access). The rate at which uncontaminated fish released into the MCA will accumulate DDT or PCBs from the local food web is currently unknown. Although this will likely not affect the success of the project, it will dictate the size at which fish are stocked. This, in turn, will affect the economics and design of the project.

10) Extent of environmental mitigation measures needed to avoid significant or unacceptable environmental impacts. This project will need to follow the same guidelines employed by the OREHP for white seabass with respect to environmental impacts. Specifically, these potential impacts relate to fish quality, genetic diversity and water quality. Concerns over disease transmission from cultured fish to wild fish will be ameliorated by maintaining high health standards for fish in culture and by having a certified CDF&G fish pathologist inspect and certify fish prior to release. Genetic quality assurance is maintained by developing a management program for broodstocks in consultation with a geneticist. The key element to maintaining genetic diversity is to make sure that the effective size of the breeding stock is large enough with respect to the genetic structure of the wild population. Water quality impacts are minimized by applying best management practices in growout facilities, primarily ensuring that the facilities are sited in areas with good water exchange and that fish are not overfed. Hatchery effluent is regulated by permits from the Regional Water Quality Control Board.

11) Whether the project resulted in an unacceptable risk to public health and safety that would require mitigation measures. This project does not present any risks to public health or safety.

12) Estimated costs for implementation. The estimated cost to implement this project is $3.26 million over 5 years, based on cost-sharing with an existing program, OREHP.

13) Extent of maintenance requirements. Annual supplementation of 50,000 cultured fish into the MCA is estimated to cost $275,000 per year, based on cost-sharing with an existing program, OREHP. This does not include ongoing assessment (post-release survival or genetic monitoring) work.

14) Whether any other potential sources of funding exist for the proposed project. As proposed, this project would benefit significantly from cost-sharing and infrastructure support already in place as part of the OREHP.

15) Whether any other project partners exist to share in implementation or maintenance responsibilities. As proposed, this project will rely on support from the community (primarily the United Anglers of Southern California) to implement the growout and outreach facets of the program. Additional support will be required from the CDF&G for fish health inspections and creel and market surveys.

16) Any potential opportunities for volunteer or community involvement in the project. As proposed, this project would follow the model established by the OREHP. This model relies on direct participation by volunteers to help culture and release the fish and also monitor the success of the program by surveying fish for tags. Presently, 11 volunteer groups are operating in the seabass program, coordinated under the umbrella of the United Anglers of Southern California. The volunteers receive fingerlings from the HSWRI hatchery at a size of 4" and raise them to a release size of 8-12" in floating cages made of netting or fiberglass. Volunteer teams that care for the fish typically consist of 4-30 individuals of all ages, genders, and ethnicity.

Spotted Sand Bass Hatchery Project

Nearshore Marine Fish Research Program
California State University, Northridge
Eric F. Miller and Larry G. Allen

Introduction

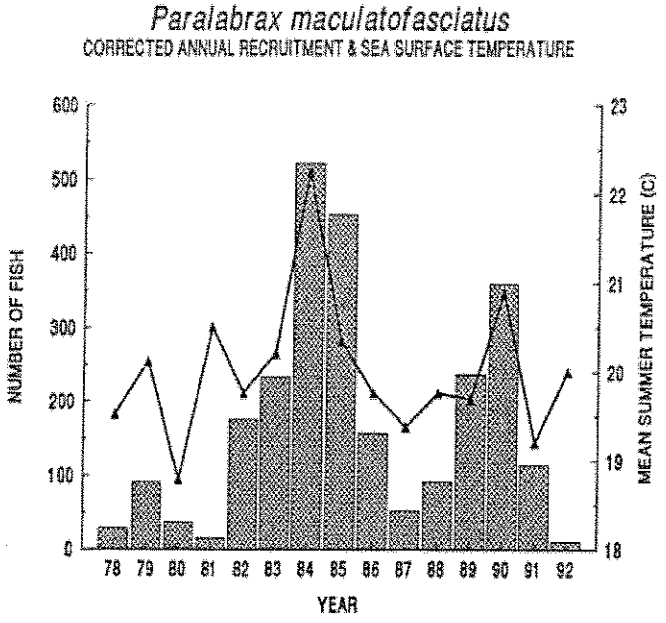
Sport anglers have historically targeted spotted sand bass (*Paralabrax maculatofasciatus*) with increasing pressure in recent years. California Department of Fish and Game angler surveys conducted in the late 1970's found less than 24,000 spotted sand bass landed. Historical landing data shows 1985 to be the peak year of the fishery with over 500,000 individuals landed, remaining above the 300,000 mark for most of the late 1980's. Landings in the 1990's consistently remained between 300,000 and 400,000 individuals annually, but started to decline by 1997. In 1999, the total landings figure fell below 200,000 for the first time in nearly twenty years. The most recent California Department of Fish and Game Living Marine Resources Status Report (2001) cites this steep decline in the landings of spotted sand bass during the last decade as coinciding with a sharp increase in angler effort.

Current estimates of the *Paralabrax maculatofasciatus* populations are limited at best, and derived primarily from landing data. Only limited tag and release studies have been conducted within Newport Bay, CA. The high rate of tag return indicated that the Newport Bay, CA population could be as small as 4-10 thousand fish in the entire bay. Total fish assemblage estimates for San Diego Bay rank spotted sand bass fifth overall (based on percent number, percent biomass, percent frequency of occurrence and index of community importance) and first among major predators within the bay (Allen, et. al 2002).

Spotted sand bass is one of three species of *Paralabrax* found locally and is the most impacted due to habitat loss as well as angling pressure. The other two members that are indigenous to the San Diegan fauna, barred sand bass (*Paralabrax nebulifer*) and kelp bass (*Paralabrax clathratus*), inhabit wider and more available habitats, namely the sandy bottoms and structures such as kelp or rocky projections, respectively. Habitat loss probably carries a far greater impact on *P. maculatofasciatus* than on the other two species. Of most importance to the spotted sand bass life history are the eelgrass beds that are frequently used for nursery grounds within all inhabited bays and harbors. Harbor expansion, both residential and commercial, further limit the critical nursery habitat, thereby limiting the self-sustaining capacity of each population.

Spotted sand bass is limited within its range to inshore shallow areas, thereby rendering it more susceptible to natural and human influences other than angling. The relative isolation of each population, due in large part to its non-migratory lifestyle, population size and habitat requirements further hinder its ability to sustain a strong fishery. Currently, it is unknown if each population is genetically isolated. Present information suggests that all California populations may annually receive larvae originating in San Diego County, (San Diego Bay primarily) with relative numbers of recruits directly related to coastal water temperatures (Allen, et al, 1995). Water temperatures and standing stock of each individual population govern its ability to remain self-sustaining. Years of elevated recruitment correspond to warm water (>19°C). El Niño years leave their mark on recorded landing data; e.g. El Niño in 1982-1983 leading to peak landings in 1985-1986. This correlation is due to the boom-bust annual recruitment cycle experienced by southern California populations. Not surprisingly, Allen, et. al. (1995) also found numerous years with failed recruitment (under 100 individuals recruited) (Figure 1).

Figure 1 Corrected Annual Recruitment of *Paralabrax maculatofasciatus* with Sea Surface Temperature Overlay. (From Allen, et. al. 1995)



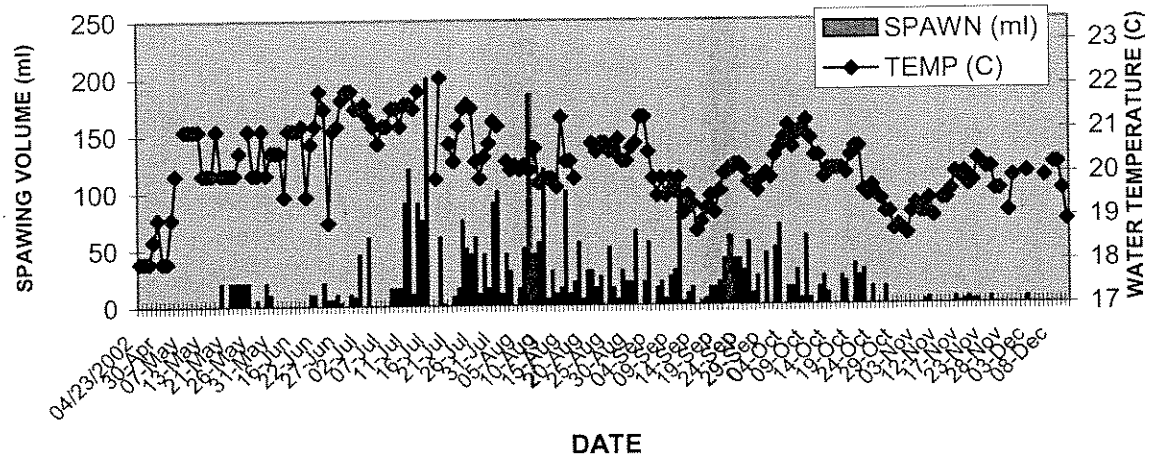
Allen, et. al. (1995) demonstrated how vulnerable the Southern California spotted sand bass populations may be to overfishing due to the variability of recruitment success. Maintenance of localized populations may require enhancement in order to support the current fishery that exists, not to mention the future size it may attain through its growing popularity.
Technical Plan: Pilot Hatchery Project

Our hatchery design and methodology is patterned after Quevedo, et al. (1995) and Tucker (1998) with slight modifications made to accommodate variations between Redondo Beach, CA and La Paz, Baja California, Mexico. The greatest difference between the two sites is the ambient water temperature at each location. Quevedo, et al. (1995) cites water temperatures consistently in excess of 20°C while temperatures in and around Redondo Beach, CA only reach 20°C in mid-summer months.

Captive adults have voluntarily spawned from May 19, 2002 to December 9, 2002, with varying levels of production. (Fig. 2) Eggs have been hatched and larvae developed to 37 days post-hatch (one individual). Currently, large groups (20-100 individuals) of larvae from a single hatch have been raised to 20 days post-hatch. Research continues to identify a working protocol to develop eggs through the larval stage to juveniles.

Figure 2. Voluntary spawning production of one broodstock tank of *Paralabrax maculatofasciatus*.

HIGH DENSITY TANK (TANK 1) SPAWNING VOLUME VS. WATER TEMPERATURE



Biological Aspects

Once eggs are collected from the breeding tanks, they are placed in a 20L bucket and allowed to separate for 30 minutes. This allows detritus (eggs and fecal matter) to sink out leaving only healthy fertilized eggs at the surface. The surface waters are gently skimmed with a cloth net to collect the eggs and transport them to a secondary tank. From this collection, samples of eggs will be taken and examined under microscopes. Living eggs are clear to translucent and cellular division and embryonic development is visible.

After live eggs are separated, counted and measured, they will be stocked into grow-out tanks according to experimental density protocol. Tanks are stocked with 10, 50, 100 ml eggs/1000L water to determine optimal stocking density. Larvae will remain in these tanks for the complete developmental term. Each tank is are constructed out of fiberglass, aerated, filled with seawater from the SEA Laboratory's main system and monitored according to the water quality monitoring protocol.

The first 25-35 days, live larvae continue to float while dead individuals sink and collect at the base of the tank to allow removal. The aeration is modified so as to allow this movement. Quevedo, et al. (1995) cites a 90% mortality rate during this period.

Feeding

The first 48 hours of development requires no feeding due to the lack of mouth and anus formation (Quevedo, et al. 1995). The next 18 days require feeding of rotifers or a suitable replacement with accompanying 20% water changes. Artificial Plankton Rotifer™ (APR) was used during Summer 2002. For the coming summer live, cultured rotifers will be included in the diets of experimental tanks, to compare to APR.

Second stage diets are introduced to the tanks starting at day 8. From 20-31 days *Artemia* sp. are introduced as a minor part of the diet in addition to rotifers (or APR) and 50% water changes. Day 32-39 switches the diet to *Artemia* sp. and copepods and relatively slow flow-through water systems. After day 40, the juveniles are able to feed on diets more similar to that of adults (anchovy or sardine) in a flow-through water system.

Tank Maintenance

Tanks are cleaned once every three days. More frequent cleanings result in excessive trauma to the fragile larvae. Daily water changes will occur, with volume of water change being dependant on the age of the larval population. Water quality measurements (dissolved oxygen, salinity, ammonia, nitrate, pH, etc.) will be taken daily with chemical test kits. Select tanks will be subsampled to assess the total operation's water quality.

Heather George (received 04/15/03)
Santa Monica Baykeeper
310-305-9645 ext. 2
watergirl@smbaykeeper.org

The Santa Monica Baykeeper has been involved in kelp restoration efforts in Santa Monica Bay for the past 6 years. Our efforts have proven effective and have earned the support of: The Army Corps of Engineers, California State lands Commission, California Coastal Conservancy, California Department of Fish and Game, Los Angeles County Regional Water Quality Control Board, The National Oceanic and Atmospheric Administration and The Santa Monica Bay Restoration Commission.

Support from the Montrose Settlements Restoration Program would allow us to continue restoring the depleted kelp beds of Malibu and Palos Verdes. Restored kelp beds result in an increase in habitat for species that are targets of recreational and subsistence fishers.

The restorative techniques used by the Baykeeper were refined in the late 1960's and early 1970's. We have successfully utilized combinations of 4 techniques to restore the stability of kelp beds over time: 1) Grazer removal: reducing urchins and other invertebrates to levels associated with healthy kelp beds. 2) Transplanting: recovering drifting kelp plants from the ocean surface or mid-waters and reattaching them to rocky reefs on the sea floor. 3) Outplanting: fixing laboratory cultured juvenile kelp to sea floor. 4) Sporophyll bags: removal of reproductive blades of kelp plants from a robust area and placing them in bags suspended above the sea floor to enhance spore distribution.

Restored areas have been generated in 6 to 8 months time and have expected permanence measured in decades. Successfully restored implies the recovery of a historical kelp bed. We have demonstrated in 2002 that we can convert 1,500 sq. meters of degraded habitat, virtually or completely absent of kelp, to 15,000 cubic meters of healthy kelp bed.

To determine the success of our restoration we establish semi-permanent transects within a given restoration area. Baseline surveys are conducted along these transects that document the presence of invertebrates, vertebrates and algae. The selected species are indicators from various trophic levels, and correspond closely to lists generated by the Catalina Conservancy Divers and Channel Islands National Marine Sanctuary. This creates a data set that is indicative of the overall health of a kelp bed and allows for the data collected to be readily compared to data collected by the CCD and CINMS. Following restoration these transects are surveyed biannually to determine the status of the restored area. Conducted in the spring and fall monitoring of areas previously restored by The Santa Monica Baykeeper will occur for a period of five years. Successful restoration would be determined from data collected via these surveys. Greater permanence, including increased numbers of and distribution of kelp plants and assemblages of representative organisms such as fish and invertebrates would deem the restoration a success.

Concerns for unacceptable environmental impacts from our current project and future work related to it have been addressed. The support of the agencies, administrations and commissions listed in the first paragraph was contingent upon strict adherence to limiting any conceivable

environmental impacts. As a result, this scrutiny of materials and techniques has produced a project where all equipment is semi permanent, nontoxic, inert or natural in composition. All sub-tidal equipment used in the project has been designed for removal upon completion of the restoration and subsequent monitoring. Maintenance of these sub-tidal sites varies from quarterly to biannually service dives where equipment is replaced, cleaned or repaired. Maintenance is typically performed prior to monitoring surveys so that the data collected, dependant on this equipment, is as accurate as possible.

The success of past kelp restoration efforts by the Santa Monica Baykeeper has resulted in an recent expansion of kelp restoration Bight-wide. NOAA and support from the State of California and other funders both private and public provide for similar efforts throughout the Southern California Bight. The California Coastkeeper Alliance is composed of six "keeper" groups: Santa Barbara Channelkeeper, Ventura Coastkeeper, Santa Monica Baykeeper, Orange County Coastkeeper, San Diego Baykeeper, and Baja Coastkeeper. Santa Barbara, Santa Monica, Orange County and San Diego are all currently involved in kelp restoration in their respective counties. This network provides support for the Santa Monica Baykeeper through consultation, acquisition of materials, and shared support of the California Coastkeeper Alliance Kelp Mariculture lab at the Southern California Marine Institute in Terminal Island (where the majority of outplants are cultured for the current NOAA project).

Based upon recent costs for this program restoration and monitoring of one 2,000 sq. meter area has approximate associated costs of $140,000 per year. Support from the Montrose Settlements Restoration Program could require the addition of another research vessel and staff member dependant upon the date of implementation. A properly outfitted vessel used for the duration of the restoration project costs $50,000. Support for that vessel in fuel, maintenance and dock fees are incorporated in the $140,000. These figures are preliminary and dependant upon the extent of work that the MSRP is interested in supporting. We at the Santa Monica Baykeeper are confident that we can produce the restoration of thousands of cubic meters of ocean for what are relatively small costs to the MSRP and other current and potential funders.

The Santa Monica Baykeeper Kelp Restoration and Monitoring Project is unique in its investment in the communities. Through community involvement the Baykeeper is able to recruit and train volunteer divers to act as scientific researchers and restorative technicians. The result of this is many faceted. The divers gain an appreciation for the fragility and importance of kelp habitat through their training. They earn a sense of stewardship documenting the growth of the kelp and observing the benefits to a community of organisms as they assist in restoring kelp beds. Indirectly they themselves become educators as they talk to their friends, families and neighbors about their work.

Education has always been a hallmark of this project. Baykeeper staff gives presentations to schools and community groups throughout Los Angeles. These lectures and field trips emphasize our reliance on local oceans and our inextricable connection to the sea. Discussions range from urban runoff, causes of coastal ecosystem degradation, over-fishing and the format ranges from in-class lectures to chartered boat trips that are frequently a first look for many students to the ocean. Through this established commitment to communities an increased public awareness of fish contamination within the Southern California Bight is currently underway.

Increased support for these efforts would result in more classrooms visited, more community groups spoken to, and a resultant increase in the understanding of fish contamination issues in the Southern California Bight.

Charles Phillips SAIC Oil and Gas Platforms Received 4-17-03
858-826-7491
charlesrphillips@saic.com

MSRP Restoration Project Idea

In response to MSRP's request for restoration project ideas, SAIC suggests the following: create artificial reefs from decommissioned offshore oil and gas platforms and/or platform-related shell mounds to enhance fishery resources within the Southern California Bight. We provide a brief description of the restoration concept and possible screening results for project evaluation criteria.

Description of Restoration Concept

Over the next 28 years, all existing oil and gas platforms in federal and state waters of the Southern California Bight will be removed. Some decommissioning has already occurred, including removal of the 4-H platforms in the Santa Barbara Channel in 1996 and the Offshore Storage and Treatment Vessel and Single Anchor Leg Mooring from the Santa Ynez Unit in federal waters in 1994. Platform removal provides materials (e.g., platform legs and cement footings) potentially suitable for construction of artificial reefs that otherwise represents a potentially costly upland disposal problem. Platform operators also are required to remove the residual shell mounds. If left in place, these mounds represent a potential obstacle to commercial fishing and, therefore, a possible dredging and disposal issue. However, these mounds also offer potential bathymetric feature that if properly designed, can serve as artificial reefs favored by some recreational fishermen.

Our recommendation is that the MSRP evaluate the potential for combining planned platform removal with construction of artificial reefs as a way to provide habitat and improve the productivity of coastal fish species that support recreational and subsistence fisheries. The "rigs to reef" concept is consistent with a National Artificial Reef Plan (NOAA Technical Memorandum NMFS OF-6, November, 1985) that was developed by NMFS under the National Fishing Enhancement Act of 1984 (P.L. 98-623). This investigation could be a collaborative effort with Minerals Management Service, California State Lands Commission, and commercial oil companies directly or through Western States Petroleum Association.

MSRP Evaluation Criteria:

The potential benefits of this project are summarized below with respect to the MSRP evaluation criteria.

Nexus to injured resources: Creation of artificial reefs using platform structures and shell mounds is intended to provide habitat and improve productivity of coastal fish communities. In particular, reef structures would be expected to benefit rockfishes, which have been heavily depleted off California by commercial fishing. Depending on

the depth of the reefs, other fish species including kelp bass, could benefit. These species are targeted by recreational fishermen and are also important to subsistence fishermen. The project would focus on platforms and shell mounds in state and federal waters within the Southern California Bight, particularly off Orange County and in the Santa Barbara Channel and, therefore, benefit fisheries resources within coastal waters of the Bight. Consequently, there can be a direct benefit to injured resources.

Duration of benefits: The duration will depend on the viability of the reef structures and resource management efforts such as restrictions on the rate at which fish are harvested from the reef. In theory, the benefits would be long term. Benefits, such as increasing population sizes for rockfish species in the vicinity of the reef(s), may require a period up to several years (e.g., 3 to 5) before they are realized.

Likelihood of success: The likelihood of success will depend on the location and depth of the site, presence of target fish species to colonize the site, and reef design. The performance of the reef can be measured by monitoring fish abundance and diversity (along with other indicator organisms such as kelp, etc.) over time. The Gulf of Mexico has a strong "rigs to reefs" program, and can provide empirical information on productivity in regions outside of the Southern California Bight (www.gomr.mms.gov/homepg/regulate/environ/rigs-to-reef/research-rpts.html).

Public health and safety: Artificial reefs would be constructed at the locations of existing platforms and/or other areas that would not interfere with navigation, boating, or other recreational activities that might represent a hazard to public health and safety. Reefs represent possible obstacles for fish trawlers (e.g., net snags), but these impacts can be mitigated by marking the sites with navigational buoys and on navigation charts.

Technical feasibility: Design and construction of artificial reefs are technically feasible. California Department of Fish and Game has guidelines and specifications for artificial marine reefs that should be incorporated.

Cost effectiveness: This project could be developed collaboratively by resource agencies and oil companies, with excellent potential for cost sharing. Maintenance costs would be minimal, and would primarily be associated with monitoring and resource management.

Environmental acceptability: This project should both enhance biological resources and provide an environmentally acceptable solution for re-use of platform materials. The net result would be a beneficial impact. Some questions remain concerning the potential for chemical contaminants in individual shell mounds. SAIC presently is conducting studies for California State Lands Commission of contaminant leaching at the 4H shell mounds that will be generate data relevant to this criterion.

Level of benefit: This project could benefit both an affected resource (fish populations) as well as the portion of the population in Southern California that use the resource for recreational or subsistence fishing.

Multiple resource benefits: The project would be expected to primarily benefit fish resources.

Opportunities for collaboration: Potential opportunities for collaboration with other resource agencies and with oil companies are excellent. Effective solutions for decommissioned oil platforms have been widely debated over the past decade, and resource agencies and oil companies would welcome ideas for cost-effective, environmentally beneficial alternatives to removal and land disposal of platform structures. Opportunities for community involvement could include input on locations of reefs and decisions regarding specific reefs that could be designated as preserves with fishing restrictions.

RIMMON C. FAY
1000 Pajaro Street, Suite C
Salinas, California 93901
Telephone (831)424-0913
Fax (831)754-6850

April 28, 2003

Ron McInnis, Regional Manager
U.S. Fish and Wildlife Service
Montrose Recovery Project
501 W. Ocean Blvd, Suite 4470
Long Beach, CA 90802

Dear Mr. McInnis:

Enclosed please find the hard copy of the proposal which was faxed to you on Friday, April 25, 2003.

I look forward to hearing from you. Should you have any questions or comments, please feel free to telephone me at your convenience.

Thank you for your courtesy in this matter.

Sincerely,

Rimmon C. Fay

This proposal describes three projects interrelated to some extent by the common adverse impact of DDT and/or PCB's discharged into the ocean off Southern California.

The first project is an extension of an undertaking of a local citizen group to protect, restore and preserve the Ormond Beach Wetlands which are bordered on the ocean side by an expanse of sand dunes. The flora is mixed with native and exotic plants including the rare Saltmarsh Birds Beak. This area is nesting ground for Least Terns and the Western Snowy Plover it is proposed for removal of exotic plants including Ice plant and *Arundo donax* to be replaced with native plants, e.g., Beach Primrose to stabilize the sand dunes.

This area will be posted to protect the nesting birds and patrolled on a daily basis to direct public use of the area and protect against predatory animals including feral cats and dogs.

Oxnard police department has offered cooperation in the protection of the resources of this area which will be marked by a locating grid and GPS stations as a guide to mapping its resources and restoration area and reporting the a) results of studies efforts to change the floral mix of the area and b) the nesting success of birds at this site.

This area is in the process of acquisition for public use and holding by the California Coastal Conservancy and other organizations interested in the preservation and restoration of land for its natural resource values. In this case Ormond Beach is a portion of nine miles of shoreline including coastal dunes here, at Madalay Beach, lakes or lagoons as well as upland areas that provide forage opportunities for raptors and other birds. In all more than 200 species of birds have been identified in using this area.

Linkage to the Mugu Lagoon to restore tidal action in the Ormond Beach wetland will be developed with the cooperation of the U.S. Naval Air Stations at Point Mugu. This linkage will be important for restoration of forage fish for the Least Terns and flora for Beldings Savannah Sparrow and the light footed Clapper Rail. Tidal action will also be important to recruitment and out planting of shell fish and crabs.

Control of runoff via the "J" street drain to the Ormond Beach Lagoon will be developed with the Ventura Flood Control District and the Oxnard Sanitation District.

The second project describes the understanding of restoration of a segment of sea shore that is currently overgrazed by sea urchins and has been invaded by the exotic alga *Sargassum muticum* which is rejected by sea urchins. It is proposed to remove both from the low intertidal area of Abalone Cove and to the extent possible control the abundance of these pest organisms at this site. Out plants of algal or sporophyte colonies will be performed over a period of eight months at spring tide episodes here in an effort to recreate Algal and plant diversity on the P. V. Peninsula where it was once very diverse and abundant. In addition invertebrates once found on the peninsula will be out planted in an effort to reestablish colonies of these organisms. Growth and survival of the out plants will be followed to measure the success of this effort.

A third project will be concerned with the culture of species once common on the P. V. Peninsula of Southern California in an effort to restore their abundance and existence once again on this area of the shoreline.

As late as 1949 beds of the giant kelp *Macrocystis* ringed the Palos Verdes (P. V.) Peninsula up to a mile offshore and at the Horseshoe kelp beds off the mouth of the Los Angeles Harbor. In 1911 Setchell and Garner observed over 100 species of algae in the intertidal habitat at White Point on the P. V. Peninsula. This algal diversity and abundance collapsed along with the abundance and diversity of many marine organisms, following the commencement of the discharge of DDT from the Montrose plant in Torrance in 1949.

As benthic algae and other plants provide much of the organic material used directly or indirectly by marine organisms, the success of their diversity and abundance is basic to the food webs of the ocean. A portion of this proposed project will be involved with efforts to restore this diversity and abundance.

Propagules of marine benthic algae will be cultured from the adult plants by placing rocks or shells in the company of adults under suitable conditions of light, temperature, and nutrient concentration. Target species for recruitment by this classical technique are listed in Table One. The adults will be collected from the Monterey Peninsula long known for its diversity of over 400 species of marine algae.

Culture of Algal Propagules and plants for out planting, 10 month commitment.

50 identified species of algae. (Identified by Barilotti & vB Seavey)
200 cultures of live identified algae for out planting
20 due 4 weeks after start of program
20 due every 4 weeks for 10 weeks to be delivered live on or about dates of predicted minus low tides for out planting at Abalone Cove.

Commitment $50,000.00

Payable every five weeks at $5,000 increments. Removal of competitive species from the intertidal at Abalone Cove. Six person field crew to remove sea urchins, *Sargassum muticum*, and properly dispose of the alga in a 6 week campaign to be carried out on low (minus) tides. Number of urchins removed to be reported, number of migrating up or laterally to be counted and removed. Red algae and or *Phyllospadix* or Brown or Green algae to be counted as they are of a sufficient size to be identified.

Results to be reported as number of species, recruiting voluntarily, number of colonies and survival of species out planted noting critical factors, e.g., exposure to light or grazers.

PERSONNEL

D. Craig Barilotti, Ph.D.

Janet Bridgers

R.C. Fay, Ph.D.

Wayne Ferren, Ph.D.

John McMullen

Alan Sanders

Arthur vB Seavey

D. Craig Barilotti, Ph.D.

Partial Vida

Retired Marine Botanist from the Kelco Co.

Experienced in outplanting kelp to artificial reefs

Instructor, Marine Botany, San Diego State University

Dr. Barilotti will provide guidance on the culture and identification of marine plants and their outplanting.

Janet Bridgers Vida

Janet Bridgers is an experienced technical writer with 15 years of professional practice in this field. She will assist in writing and editing reports from this project and administer the business affairs of the project.

Rimmon C. Fay, Ph.D. Vida

Rimmon C. Fay has more than forty years of experience working along the shoreline of the mainland and among all of the channel islands, first as a chemist analyzing the composition of seawater, USC 1960-1962, and then as a consultant to industry following the survival of coliform bacteria in seawater. O.C.S.D. 1963-1964.

He has developed a working knowledge of marine fishes, algae, and invertebrates with a specialty of benthic ascidians. Fay and Vallee 19__ So. Cal. Acad. Science

He served on the Regional Coastal Commission for Los Angeles and Orange Counties 1973-1979 and represented this Commission on the State Coastal Commission 1975-1978 followed by membership on the Marine Review Committee of the California Coastal Commission from 1979 to 1994 in the study of the environmental effects of the San Onofre Nuclear Generating Station. (SONGS)

Dr. Fay is the principle of Pacific Bio-Marine Laboratories and will act as principal investigator in these studies.

Wayne Ferren, Ph.D.

Partial Vida

Position Coastal Habitat Ecologist

University of California Santa Barbara

Engaged in restoration of Carpenteria Lagoon

Familiar with area of Ormond Beach flora and fauna

Dr. Ferren will provide guidance on the restoration of the natural resources of the Ormond Beach wetlands and their upland areas.

John McMullen Vida

Mr. McMullen has more than 25 years of experience in aquaculture mainly with the green and red abalones and lately with the carnivorous giant keyhole limpet Megathura crennulata.

He will be a consultant to the portion of this project concerned with the aquaculture of sipunculids, brachiopods, molluscs, arthropods and fishes.

Alan Sanders

Mr. Sanders has eleven years of experience with the flora and fauna of the Ormond Beach Wetlands where he single handedly protected the birds and the habitat. He is a skilled photographer of animal life and plants. He will provide excellent photodocumentation of all phases of this project.

Arthur vB. Seavey

Partial Vida

M.S. Marine Botany, U.C. Davis

Principal in Monterey Abalone Farms

Major source of propagules of algae for outplant studies and outplants of rock scallops, Hinnites multirugosus

Montrose Restoration Project Invertebrates

Terebratalia transversa Brachiopod

"Borrow from Puget Sound to establish stock colony.

Culture techniques as per literature and reports of Lowenstam.

Juveniles to be allowed to attach to rocks and then outplanted in suitable habitat on the Palos Verdes Peninsula, e.g. Long Point

Outplants to be followed for 10 months minimum to note survival and/or reproduction.

$500.00 minimum for stock culture to be held in a minimum of two suitable refrigerated aquaria

Themiste discrita Sipunculid

Juveniles to be cultured to a size considered large enough to outplant when specimens will be outplanted under rocks in suitable habitat on the Palos Verdes Peninsula.

To be held in a minimum of two suitable refrigerated aquaria.

Travel/or purchase from collectors in Puget Sound

$500.00 minimum for stock culture

2 aquarium coolers	$350/ea	$700
2 pumps	$50/ea	$100
6 nets	$10/ea	$ 60
Tank vacuum for cleaning		$ 30
Air pump for cleaning		$50

Table 2 Target Species for Restoration

Enhancement in Southern California as available

Aniantis sp.	surf clam
Cardium cf nutalli	painted cockle
Trachycardium nutalli	giant cockle
Upogebia pugettensis	mud shrimp
Cycloxanthops novemdentatus	kelp crab
Taliepus nuttalli	kelp crab
Alpheus californiensis	giant pistol shrimp
Protothaca laciniata	sand bar clam
Chione sp.	cockle
Tigriopus californiensis	tidepool copepod
Acmaea mitra	black pointed white limpet
cf Terebra sp.	once common sand snail useful in Paleoecology
Semele dehissa	clipped semele
Typhogobius cf newberryi	tidal goby
Hypsoblennius gilberti	tidepool goby
Haliotis cracherodi	black abalone
Haliotis corrugata	pink abalone
Haliotis fulgens	green abalone
Haliotis rufescens	red abalone
Haliotis sorenseni	white abalone

Table 3

Species observed to voluntarily recruit in Southern California after control of DDT discharge was initiated.

Loxorhyncus grandis	sheep crab
Saxidomus nutalli	Washington clam
Donax gouldeana	bean clam
Mya sp.	mud clam
Astrea undosa	wavy top snail
Sanguinolaria	butter clam
Tresus nuttallii	gaper clam
Hinnites multirugosus	rock scallop
Protothaca staminea	razor clam
	surf cockle
	bay scallop
Ostraea sp.	exotic oyster

Amiantis sp. A surf clam. One individual was observed in L.A. Harbor 40+ years ago.

Trachycardium quadrangeum empty shells of this large cockle are frequently observed on the bottom in many locations suggesting that this species was once common and abundant. It is now observed infrequently in Alamitos Bay along with Saxidomus nuttalli and once abundant Chione.

Protothaca laciniata has been reported from the entrance channel to Alamitos Bay. This is the only location where it has been reported.

Cardium nuttalli A small colorful cockle has been observed as a single individual in Morro Bay.

Acmaea mitra A colorful often solitary limpet was once infrequently found off Malibu but of late it has not been observed.

Typhogobius sp. The tidewater goby is considered uncommon in the brackish estuaries of Southern California (Swift). It is reported from the Ormond Beach Lagoon, Malibu Lagoon and other tidal creeks (Swift).

Tigriopus californicus Tidepool copepods currently known only from high intertidal tidepools at Bird Rock, La Jolla. Isolated colonies are vulnerable to spills or other disasters. Apparently suitable tidepools exist on the P.V. Peninsula at Flatrock and White Point.

Target Animal Species for Reintroduction or increase in abundance in Southern California

While not exhaustive in survey, the author made thousands of underwater observations in southern California over a period of more than fifty years. His attention and orientation was to the diversity of marine life found in these waters and its various habitats. Some organisms reported from local waters were never observed and may be considered to be extirpated or at such reduced levels of abundance that they are not found with any frequency in this area. This survey must necessarily be considered incomplete and is provided to the best of the author's knowledge subject to museum research and fieldwork.

Notes: Terebratalia transversa Brachiopod A specimen of this lampshell was found on the L.A. Breakwater ca 1955 and only seen as living animals in Puget Sound, Washington State.

Themiste discrita Specimens were rarely found on the Palos Verdes Peninsula as living organisms ca 1956. The species is reported as living in Washington State (Kozloff)

Gari californica The senset clam was collected from cobble rock in Abalone Cove and off Sunset Blvd., Santa Monica Bay. It has not been observed in the last forty years.

Alpheus californiensis This giant of a pistol shrimp was observed in the Ballona Lagoon when it was subject to "restorative?" dredging and reported from San Diego Bay (M. Wicksten, University of Texas, pers com)

Cycloxanthops novemdetatus Once rarely seen on the P.V. Peninsula. This kelp crab has been observed on Catalina Island.

Taliepus nuttallii Another kelp crab once seen in Southern California and now extirpated or very rare.

Upogebia pugettensis Not observed in Southern California in the past 50 years. Reported from the mudflats of Washington State (Kozloff).

Mud crab once reported as common in L.A. Harbor. One specimen uncovered by "restorative" dredging of Ballona Lagoon.

Semele dehissa clipped semele clam Once common in rocky cobble, gravel beds. Living organisms no longer seen.

Following the control of DDT discharges several species were observed to actively recruit that had not been observed during the episode of DDT pollution. Table 3. This suggests that conditions may be favorable for artificial means of encouraging their reproduction and/or recruitment.

Montros Recovery Project

Proposed Budget

Lab Rental	$12,000.00
Office Rental	15,000.00
Utilities	3,600.00
2 4x4 p/u trucks	36,000.00
Maintenance, fuel	4,000.00
Insurance	24,000.00
Paper 20 reams	80.00
graph 2 reams	20.00
Drawing and Mapping	2,000.00
Photography Micro, Macro, Video	1,500.00
Video Camera	1,000.00
Trinocular Microscope(used)	1,500.00
2 Computers with printers	1,200.00
Consultants 20 hours @ $100/hr	2,000.00
Wetlands, Mariculture, Statistics	
Licenses, Permits	320.00
7 2x Radios 1 base	720.00
2 vehicles	
4 field	
3 pair binoculars	150.00
6 x flashlights, waterproof	72.00
6 x tapes measuring 100m	60.00
2 ea sq meter, 4 sq meter quadrant markers	40.00

60 signs warning bird refuge	120.00	
12 pr boots	480.00	
12 sets rain gear	720.00	
tools	200.00	
Books, subscriptions, meetings	300.00	
48 report binders	48.00	
40 signs grid markers	200.00	
2 GPS receivers	300.00	
Contingency	2,000.00	
Culture, Inverts, fishes	215,000.00	
1000 Beach Primrose Cultivation for transplant	5,000.00	
1000 Salicornia cultivation for transplant	5,000.00	
Subtotal		$334,630.00
20 Overhead		66,926.00
TOTAL		$401,556.00

Joseph Chesler 4-24-03
LA County Dept. of Beaches and Harbors
310-305-9533
jchesler@dbh.co.la.ca.us

MONTROSE SETTLEMENT RESTORATION PROGRAM
POTENTIAL PROJECT LIST (Revised)

1. Marina del Rey Fishing Access Enhancement -Channel Ferry Service (est. - $1,800,000)

Enhance fishing, pedestrian, and bicycle access along the Marina del Rey Entrance Channel, as follows:

a) Provide two (2) new passenger ferry boats, construct minor dock facilities and signage to enable service expansion of the Marina Water Shuttle (passenger ferry) to enhance fishing, pedestrian, and bicycle access along the southern portion of Marina del Rey;
b) Construct pedestrian amenities and improve fishing access at the Pacific Avenue bridge and along the northern levee of Ballona Creek, west of the Pacific Avenue bridge; and
c) Realign portion of the South Bay Bicycle Trail to improve pedestrian safety at the 64th Avenue parking lot, and along Ballona Creek, west of the Pacific Avenue bridge.

2. White Point Beach/Fishing Improvements (est. - $2,300,000)

Improvements to the lifeguard and public fishing access, as follows:

a) Reconstruct lifeguard substation with combined new public restroom;
b) Construct small public fishing pier with fish cleaning stations to enhance public safety; and
c) Construct parking lot and site stormwater mitigation measures

3. Pt. Vicente Fishing Access Improvements (est. - $750,000)

Improvements to access and accommodations for fishermen through public restroom renovations, reconstruction of the public accessway, development of a picnic area, renovation of the parking lot, and addition of stormwater mitigation measures.

4. Pt. Fermin Access/Fishing Improvements (est. - $1,500,000)

Improve existing landscaping and install new plantings, picnic benches, slope stabilization, security lighting, paving, and stormwater mitigation measures to provide enhanced beach and fishing access and improved water quality.

CHANNEL ISLANDS MARINE RESOURCE INSTITUTE

P.O. Box 1627
Port Hueneme, CA 93044-1627

(805) 488-356

April 15, 2003

Anne Hoecker
Fish and Wildlife Service
Anne_Hoecker@rl.fws.gov

Re: Montrose Settlement Restoration Program

I am responding to the Montrose Settlement Restoration Program (MSRP) which is seeking restoration project ideas for the southern California Bight.

One genus of marine gastropods that was previously found in abundance in the bight is the abalone. In particular we propose to work on restoration of the white abalone (*Haliotis sorenseni*). The white abalone is one of seven species that inhabit ocean waters of the US west coast, and one of five species that inhabit the southern California Bight. The deepest living of these species, the white abalone was historically found along the coast and Channel Islands from Point Conception south to Punta Abreojos, Baja California, Mexico. The historical center for abundance was around the Channel Islands. Like other abalone, this species was targeted by sport, subsistence, and commercial fishers, with 268 metric tons landed between 1969 and 1977. With a life span of 30 –40 years it is estimated that the last successful recruitment of this species was in 1966. A NOAA NMFS Technical Memorandum (Hobday and Tegner 2000) concluded that the population density of the surviving animals is too low to permit successful recovery. Without intervention the species may become extinct by 2010.

The Channel Islands Marine Resource Institute (CIMRI) in Port Hueneme, California is a non-profit, public-benefit, 501(c)(3) California corporation. Our dual goals are marine education and marine enhancement. CIMRI has been involved in efforts to study and restore white abalone since the late 1990s. Working with the California Department of Fish and Game, the National Park Service, the National Marine Fishery Service, the U.S. Fish and Wildlife Service, Scripps and UC Santa Barbara, we have helped to institute a program to study and restore the white abalone to its former habit. We have held wild white abalone since 2000 and began raising their offspring since May 2001. Our goal is to outplant hatchery-raised abalone to areas in southern California from which they have been extirpated.

We believe that our restoration work with white abalone is suitable for integration into the Montrose Settlements Restoration Program. Here are is how the project meets the criteria that you have laid out:

- **Geographic location of the project site** – White abalone restoration efforts will be conducted at several of the Channel Islands off the coast of southern California. Initial efforts will be focused on sites at Catalina Island and Santa Cruz Island.

- **Determine how projects located outside the southern California Bight benefit injured resources and/or lost services in the southern California Bight** - Our hatcheries in Oxnard and Port Hueneme and our abalone restoration sites on the Channel Islands are within the southern California Bight.

- **Degree of benefit to natural resources and/or the public if the project is implemented** – The fossil record indicates that abalone have been present on the west coast of the North American continent for at least 100 million years. A recent Technical Memorandum by the National Marine Fisheries Service suggests that the white abalone may go extinct in our lifetime. The demise of the white abalone is not an isolated case. Record low stocks of all abalone species resulted in closures in 1996-7 to all recreational, subsistence, and commercial fishing for these mollusks. Abalone fishing has been associated with the culture of California since the time of the native Americans. In recent times, fishing for abalone was a significant recreational, social, and food gathering activity for thousands of Californians and tourists. Efforts to restore the white abalone will prevent the extinction of this unique California resource and may benefit similar efforts to restore other California abalone species. Restoration will also assure that the white abalone and others do not disappear from the memory of Californians and may once again serve as a resource for recreational and subsistence fishing.

- **Lag time before project benefits are realized** – As with all rebuilding projects, a great deal of time is required to lay solid foundations. Foundations of the program to rebuild white (and other) abalone stocks in southern California were laid in the mid-1990s by CIMRI and an *ad hoc* group of scientists, fishermen, conservation organizations, universities, and state and Federal agencies. Much of the planning stage has already been accomplished or is underway. Initial Federal permits have been secured. Biological factors, such as slow growth and irregular recruitment, that contributed to the decline of the abalone in southern California will also long-term rebuilding efforts. Our present restoration plan calls for the establishment of abalone colonies in the ocean using hatchery-raised adult abalone. These animals will be capable of spawning immediately upon release. At this time our first "crop" of hatchery raised animals is almost two years old. Depending upon the outplanting design, up to another 2 –3 years of hatchery growth will be required prior to release of these animals. Once outplanted animals will be monitored for survival and recruitment of subsequent generations. Benefits, in the form of self-reproducing populations should be detectable within 5-10 years.

- **Duration of benefits after they become measurable** – Once white abalone are reestablished in areas from which they have become extirpated, their populations should persist for more than 50 years. Fishing pressure no doubt contributed to the previous decline of this species but is not expected to be a threat to the populations in the future. Abalone resources in California are managed by the California Department of Fish and Game (as an endangered species, white abalone is also under NMFS jurisdiction). With the failure of abalone and other fisheries, there has been a change in the marine resource management paradigm at the California Department of Fish and Game. No take of abalone in southern California will be allowed until stock recovery has been documented. Once fisheries reopen, new management approaches should prevent a replay of the previous decline.

- **Description of key elements of the projects and how success could be monitored/determined** – A plan to save and rebuild white abalone populations in southern California was outlined by Davis (1998). The four steps of the plan are: (1) locate survivors by surveying historic habitat; (2) collect brood stock from the survivors; (3) breed and rear a new generation of brood stock; and (4) re-establish refugia of self-sustaining brood stocks in the wild. To date the first three of these objectives have been accomplished. In 2000 CIMRI received its first wild brood stock and has subsequently spawned several generations of white abalone in the hatchery. From this point, key elements of the project will be to (a) gather additional wild abalone to increase the genetic diversity of the hatchery broodstock; (b) continue research that will identify key elements of the life biology of the white abalone. This will provide knowledge about the interaction of the abalone with its habitat and other organisms; it will assist cultivation efforts and maximize survival of outplanted animals. Success can be monitored by improvements in growth and survival in the hatchery and the wild; (c) Grow out existing and new families of white abalone in the hatchery. (d) locate suitable sites for outplanting (e) outplant and monitor survival of abalone. Success of this phase of the program will be determined by regular surveys of the outplanted area.

- **Has the method of project implementation been tested before, and if so, whether it was successful elsewhere?** The outplanting of abalone into the natural environment has been conducted throughout the world for almost five decades. Much of this work has been done on a small scale but indicates that planting success is variable and is affected by the condition of the abalone at release, size, planting method, habitat type, food availability, and predation (McCormick et al. 1994). Recently, high survival has been achieved in Japan and South Africa.

- **How and whether performance could be measured** – Performance of this project can be measured both the hatchery and in the field. As noted above, performance in the hatchery will be measured by the production of animals for outplanting and by the amount of scientific knowledge generated about the life history of the white abalone. In the field a monitoring program will be established to track the survival, growth, and recruitment of the outplanted abalone at several sites. A standardized means of

assessing abalone recruitment, the Abalone Recruitment Module, or ARM has been in use in the Channel Island National Park for a decade.

- **Whether any extenuating factors could affect the potential success of the project -** Presently, most white abalone often waters as deep as 50 meters. To overcome the challenge of monitoring sites at these depths two approaches will be taken. The first outplanting efforts will focus on areas at the shallow end of the range (20 meters) to enable the use of divers for this work. As the project progresses we will work to develop outplanting and Abalone Recruitment Modules that can be placed and retrieved from deeper waters without divers. Abalone in southern California are succeptable to Withering Syndrome caused by a rickettsia like protozoan (RLP). It is knot know if the cool waters at depth will provide a refuge from RLP. White abalone in the hatchery have been successfully treated with antibiotics to prevent withering syndrome.

- **Extent of environmental mitigation measures needed to avoid significant of unacceptable environmental impacts** – The project itself has will have little negative impact on the coastal environment. Possible genetic impacts are being mitigated through a controlled breeding under the supervision of a geneticist at Scripps, who is an expert in abalone genetics. Possible environmental impact from the spread of disease are being mitigated by cooperation with patholoists at the Califoria Department of Fish and Game and University of Washington.

- **Whether the project resulted in an unacceptable risk to public health and safety that would require mitigation measures -** It will not.

- **Estimated costs for implementation** – During the last seven years CIMRI has successfully helped forge the effort to restore white abalone. It has worked cooperatively with resource managers and permitting agencies, established two cultivation facilities, and had unprecedented success in the large-scale cultivation of an endangered species. CIMRI seeks to continue to our hatchery program and begin the field testing phase of the project. Field work in coastal waters can be an expensive proposition. To mitigate these costs CIMRI has developed a cooperative agreement with the Channel Islands National Park for the use of Park vessels for field work within the Park. In addition we will work cooperatively with the University of Southern California Wrigley Marine Laboratory for outplanting and field work on Catalina Island. Monies will be needed to operate our hatcheries, conduct research, and conduct outplanting and field studies. We anticipate an annual budget of approximately $150,000 for this project.

- **Extent of maintenance requirements** – Maintenance of wild brood stock and hatchery-raised abalone in the hatchery is a form of animal husbandry, and thus requires constant attention. Funds are required for labor, feed, systems operation and maintenance and overhead. Field operations are intermittent, activities divided into site selection and initial monitoring, outplanting, and follow-up surveys.

- **Whether any other potential sources of funding exist for the proposed project** – CIMRI is always seeking potential sources of funding for the project. Initial funding for field surveys and broodstock holding were provided by a NMFS Saltonstall-Kennedy (S-K) Grant. We subsequently reapplied but did not receive funding due to limited government resources. The S-K grant is a potential source of funds in the future, however, the program is undergoing change and long-term projects such as this may not fare well. The local Ventura County Fish and Game Commission has provided limited funding to cover overhead for CIMRI's white abalone work. It may continue to do this in the future but there are no guarantees. In cooperation with Scripps, Fish and Game, UC Davis and the University of Washington, CIMRI is presently applying for research funding for white abalone. Tight federal and state funding will no doubt limit this source of funding. We also solicits funding from private foundations.

- **Whether any other project partners exist to share implementation or maintenance responsibilities** - As noted above, CMIRI has and continues to work to form project partners for the restoration of white abalone in southern California. We receive invaluable support for the continued operation of our hatchery facilities from Reliant Energy. For our field operations we will continue to work with the California Department of Fish an Game, the Channel Islands National Park, University of Southern California, Wrigley Marine Laboratory, UC Santa Barbara. Fish and game not only participates by collecting wild abalone for broodstock, and outplanting, it also helps with disease and pathology screening.

- **Any potential opportunities for volunteer or community involvement in the project** – From its inception, CIMRI has depended upon volunteers and community involvement to build its enhancement and educational programs. We expect to continue this approach. Students and volunteers helped design and build the CIMRI seawater supply system and the white abalone broodstock holding facilities. Volunteers help gather food for the white abalone and participate in research and husbandry activities. There may also be opportunities to participate in the field operations. In the past the Project Leader, Tom McCormick, has worked with local sport diving groups such as the Catalina Conservancy Divers.

Thank you for your consideration of CIMRI's white abalone restoration program for funding. I can be reached directly for questions at the number or email below.

Sincerely,

Thomas B. McCormick
CIMRI Board Member
805.640.1180
T_McCormick@ojai.net
P.O. Box 1528
Ojai, CA 93024

Literature Cited

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E-mail from Michael Lyons: Received 4-15-03

Your letter of March 17, 2003, asked for restoration project ideas. The Los Angeles Regional Water Quality Control Board currently is developing a plan to clean up contaminated sediments present in Consolidated Slip, a waterway within Los Angeles Inner Harbor. We are working closely with the Port of Los Angeles, the U.S. Environmental Protection Agency and other interested parties to evaluate cleanup alternatives and then fund and implement a cleanup plan. The State Water Resources Control Board has authorized the use of $2.5 million to implement this project and we have approximately $1 million available from settlements of past enforcement actions to commit to this project. We conducted a sediment characterization study in late 2002 to provide a good estimate of the volume of contaminated sediments that require remediation. Once this information is available, we will be able to evaluate alternatives and develop cost estimates for the cleanup project. We are guessing that the project could cost from $15 to 25 million, but the overall cost could be significantly higher or lower depending on the volume of contaminated sediments present and the actual remediation alternative selected. If we are able to dredge and dispose of the contaminated sediments at a nearby location, the costs could be on the low side. We also plan to pursue cost recovery from responsible parties that may have contributed to the existing sediment contamination problem.

The Consolidated Slip sediments are contaminated with several pollutants of concern, including DDT, PCBs, PAHs, and several trace metals. Much of the DDT contamination probably originated from the Montrose Chemical Corporation's manufacturing site in Torrance, but other industrial dischargers and stormwater runoff probably contributed to the contamination problems.

Remediation of the contaminated sediments found in Consolidated Slip would contribute to your goal of increasing recreational and subsistence fishing opportunities within the Southern California Bight. These fishing activities are commonly pursued in the Cabrillo Pier area and from the breakwaters of Los Angeles Harbor. There are warnings and fish consumption advisories against consuming certain species, such as white croaker, due to high PCB and DDT levels found in their tissues. Although these fish may be picking up these pollutants from contaminated sediments on the Palos Verdes Shelf, it seems likely that they also get some portion of these pollutants from the contaminated sediments in Consolidated Slip. Thus, cleaning up the contaminated sediments in this area would remove a source of contamination and ultimately should reduce the body burdens of DDT and PCB in the fish caught by recreational and subsistence fishermen. Another benefit would be removal of a source of contaminants that may be adversely affecting benthic infaunal organisms that serve as a food source for seabirds.

I would be happy to provide additional information if this project falls within the scope of your restoration program.

Michael Lyons
Environmental Specialist
California Regional Water Quality Control Board, Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

213-576-6718

Wilmington Community Urban Redevelopment

Concept Proposal

Introduction

This concept proposal provides new and old ideas for the urban redevelopment of Wilmington and the Los Angeles Harbor. The ideas have come from 100's of Wilmington residents who have made suggestions and shared their dreams with us. No professional consultants or urban planners were hired or participated. This paper describes three phases in detail. The Wilmington Citizens Committee and the Wilmington Coalition For A Safe Environment has lead this community urban redevelopment effort by interviewing and talking with 100's of local community people since the year 2000. The concept proposal has grown over the years as new ideas have been recommended.

Phase I

Wilmington Harbor View Promenade Park & Community Center

Phase II

Wilmington Leeward Bay Promenade, Marina & Wetlands

Phase III

Wilmington Avalon Blvd. South Corridor

February 18, 2003 Rev. F

Wilmington Coalition For A Safe Environment
140 West Lomita Blvd
Wilmington, California 90744

wilmingtoncoalition @ prodigy.net

310-609-9198 310-704-1265

Jesse N. Marquez - Chairman

Wilmington Leeward Bay Promenade, Marina & Wetlands

Wilmington Urban Redevelopment Phase II Project Proposal

Introduction

The Wilmington Leeward Bay Promenade, Marina and Wetlands is a project proposed by the Wilmington Coalition For A Safe Environment (Wilmington Coalition) for the expansion and development of Leeward Bay officially known as the Consolidate Slip Marina into a shoreline village, expanded boat slip marina, public boat ramp, promenade walkway with seafood restaurants, seasonal shops, an Island Paradise Theme community marine recreational park with a public swimming lagoon and public fishing lake. The project would also include the restoration of a former wetlands and wildlife tidelands land area. The basic concept would be similar to a combination of Port's O' Call in San Pedro, Shoreline Village in Long Beach and Seaside Lagoon in Redondo Beach. This project is designed to address four of Wilmington's major concerns:

1. Community Urban Redevelopment
2. Expanded Community Marina Recreational Space
3. Community Economic Development
4. Wetlands & Wildlife Restoration
5. City & Port of Los Angeles Negative Environmental Impacts

The Wilmington Leeward Bay Promenade, Marina & Wetlands Project is the proposed 2nd Phase Plan for the Port of Los Angeles and City of Los Angeles to address many of these concerns and begin a new future for the growing Wilmington community.

Wilmington Leeward Bay Promenade, Marina & Wetlands

The Wilmington Coalition proposes that the Port of Los Angeles and City of Los Angeles re-allocate and re-zone existing land in the Los Angeles Harbor for greater Wilmington community urban redevelopment, marine recreational public use, California wetlands and wildlife restoration. The proposed land area would include all land from the current waterfront shoreline on the east end where Consolidate Slip Marina is located north to Anaheim Street west from Henry Ford Road along Alameda Street to Avalon Blvd. and connecting with Banning's Landing on the west.

Redevelopment would occur in two phases. The first phase would include all the ideas presented in this concept proposal which would encompass approximately 50% of the total proposed land area with the balance being reserved for future development in a second phase. The first phase would begin on the east end at Henry Ford Road west to approximately where "E" street intersects Alameda street.

The project proposes that approximately 50+ acres at the corner of Anaheim Street and Henry Ford Road which is north of the Leeward Bay Marina which was formally open coastal marsh tidelands be restored as a nature wetlands and wildlife preserve. We recommend that it be called the Dominguez Channel Wetlands & Wildlife Preserve. The land is currently being used as a temporary import car storage parking lot and is empty approximately 30% - 40% of the time during of the year. The wetlands area could include a ranger station and a nature walkway to view California coastline tidelands, native fauna and wildlife. Currently numerous species of wildlife birds such as the white egret, brown pelican and mallard duck live under a train bridge, surrounding piers and brush.

This new Dominguez Channel Wetlands & Wildlife Preserve area could become part of the Southern California Wetlands Recovery Project sponsored by the California Coastal Conservancy which was created by the California state legislature to preserve, protect and restore the resources of California's coast.

The project area could also be designated as part of the new California Coastal Trail which was established by the California legislature to create a 1200 mile long California Coastal Trail. The entire project area would become one of many newly designated historical landmarks.

It is proposed that the existing Leeward Bay Marina be relocated further west to allow space for the new wetlands and wildlife preserve area. We recommend that the number of boat slip spaces be tripled to accommodate the lack of available low rental boat slip space, local community desire for additional small boat craft docking space and increased on-board boat living designation.

We suggest a new road be built beginning at the east intersection of "E" Street and Alameda Street south to the waterfront for access to the relocated Leeward Bay Marina and other new redevelopment projects.

To the west of the wetlands area would be the creation of a new community recreational park with an Island Paradise Theme. The park would contain botanical gardens with native California plant species, waterfalls, nature walkways and an open amphitheater. It is proposed that a 25-50 acre manmade seaside lagoon be constructed for public swimming. It is further proposed than an additional 25-50 acre public fishing lake would also be constructed to compensate for the Port not having a pier and clean ocean water for public fishing.

It is proposed that the Island Paradise Theme Park would be incorporated into the design of promenade walkway, jogging trail and bike trail which would lead to the new Leeward Bay Marina location. We propose that adjacent to the Leeward Bay Marina to the east that a new shoreline village site could be built. The shoreline village could include the building of several seafood restaurants, open fish markets, seasonal stores, small retail kiosks, a two story commercial office building with several large rental rooms for meetings, banquets etc..

It is recommended that low density waterfront apartments and condominiums be built north of the Leeward Bay Marina up to Alameda Street along the new proposed road. The Wilmington and Harbor community over all is growing and needs additional residential space. Wilmington is the only California coastline community with no residential views of a marina, harbor or ocean coastline.

Adjacent to the shoreline village to the east there could be a new public and commercial diving school, a public sailing, boating school and a youth sailing program. One Wilmington boat owner has already volunteered to donate two sailing boats for the youth sailing program. There could also be several commercial charter fishing businesses, a few small retail boat sales shops, marine industry repair shops and sportsman's fishing tackle stores. We recommend a new public boat launch to be built for boat sportsman wanting access to the ocean for fishing or for public recreational use. Wilmington currently has no public boat launch for waterfront access.

To the west of Leeward Bay Marina it is further proposed the Port of Los Angeles explore the possibility of constructing and operating an Ocean Water Reclamation Facility to clean the current polluted ocean waters in our bay. The cleaned water would also supply the public swimming seaside lagoon and waterfalls. The facility would be one of the first in the United States and world to address the serious ocean pollution problem and would probably also be eligible for state, federal funds and some private foundation grants.

To the west of the Ocean Water Reclamation Facility the Port of LA and the City of Los Angeles could invest in an alternative electrical energy source such as small LNG Fuel Electrical Power Plant which could use new technology micro turbine engines. LNG is a clean, non-polluting, environmentally friendly and low cost fuel. The Port could also build solar energy panels all along the vast waterfront, seaside village and on top of Port buildings. One potential project for the phase two development could be the establishment of a fish hatchery business to the west of the LNG Fuel Power Plant.

The Wilmington community would like the marina, promenade and recreational park to be maintained by the Port of Los Angeles and not the Los Angeles City Recreation and Parks Department.

Project Features

This project addresses several significant Negative Environmental, Economic and Environmental Injustice Impacts on the Wilmington community. This project provides positive and constructive mitigation solutions to serious community, economic, safety and public health problems caused by the Port of Los Angeles past and current business operations and proposed expansion.

The project contributes to California's goal for wetlands and wildlife restoration and establishment of the 1200 mile California Coastal Trail. The park provides additional green tree and plant bio-sphere oxygenation for the community. The park provides additional community marine recreational park space, access for fishermen and recreational boaters to the ocean. The Youth Sailing Program would provide a new recreational opportunity for young adults and be an excellent gang diversion program.

The ocean water reclamation facility would be one of the first of its type in the nation and world to address the serious ocean pollution problem. The cleaned water would contribute to improving the ocean water quality throughout the Los Angeles Harbor and Long Beach Harbor. It could also help address the water quality problem at Cabrillo Beach in neighboring San Pedro which every month receives an "F" Grade water quality evaluation.

The use of solar energy panels and an alternative fuel electrical power plant would eliminate dependence on polluting fossil fuels, hazardous nuclear energy and high energy costs.

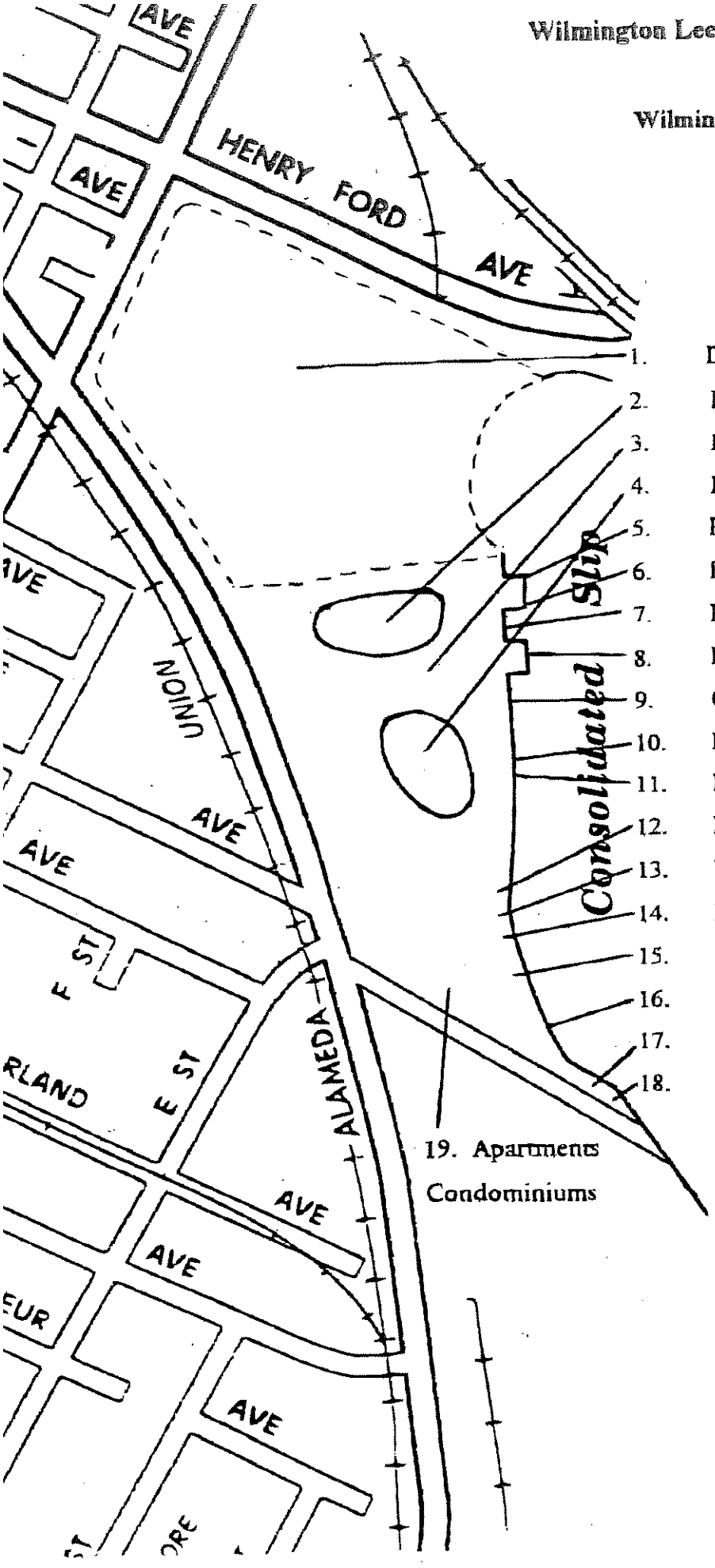
The restaurants, fish markets, seasonal tourists shops, kiosks, commercial retail office space, rental rooms, fish hatchery, reclamation facility and solar energy panels would create temporary and permanent local jobs, build-up the local economy and bring new revenues to the Port and City of Los Angeles.

Project Notes

1. It is requested that the construction be a union or have project labor agreement with priority being given to local Los Angeles and Harbor Area construction companies and small- minority owned businesses.
2. It is further requested that potential contractors and architectural firms submit a plan that would include participation from trained students from the Wilmington Skill Center, Harbor Occupational Center, Harbor College, Banning High School and Union Apprenticeship Programs.
3. It is requested that the South Coast Botanical Garden, Audubon Society, Sierra Cub and other similar organizations be invited to participate in the projects ecological design, wetlands and wildlife restoration.
4. It is requested that alternative energies and solar energy panels be built and incorporated into the project so as to make it as self sufficient and environmentally friendly as possible.
5. It is requested that the Best Available Technologies (BAT) be incorporated into the project design to address as many negative environmental impacts on the Wilmington and Harbor communities.
6. It is highly desirable that a plan be designed that would allow extension of a Metro Blue Line Train Terminal into Wilmington and a San Pedro Red Line Train Terminal connection and existing bike path.
7. The Dominguez Channel Wetlands & Wildlife Preserve be submitted as a Southern California Wetlands Project.
8. The Wilmington Leeward Bay Promenade, Marina & Wetlands Project be submitted as a California Coastal Trail landmark.
9. The project and park would be governed by a Wilmington residents committee elected at large.
10. UCLA, USC, Cal. State Long Beach and LA Harbor College should be recruited to help in the overall concept design.

Wilmington Leeward Bay Promenade, Marina & Wetlands

Wilmington Urban Redevelopment Phase II



1. Dominguez Channel Wetlands & Wildlife Preserve
2. Public Fishing Lake
3. Dominguez Wetlands Public Park
4. Public Swimming Seaside Lagoon
5. Public Diving School
6. Public Sailing & Boating School
7. Public Boat Launch
8. Boat Retail Sales Slips
9. Charter Fishing Boat Slips
10. Boat Repair Shops
11. Boat & Fishing Tackle Shops
12. Promenade Walk
13. Promenade Restaurants & Open Fish Markets
14. Promenade Retail Stores
15. Commercial Office Building
16. Leeward Bay Marina
17. Ocean Water Reclamation Facility
18. LNG Fuel Power Plant
19. Apartments
    Condominiums

N E S W

Data Gap

Restoration and Long Term Monitoring of Peregrine Falcons on the Channel Islands

Report submitted by: Brian James Walton
Predatory Bird Research Group
University of California
Santa Cruz, CA

Report date: September 1994

INTRODUCTION:

The American peregrine falcon (*Falco peregrinus anatum*) is a bird-eating predator of both aquatic and terrestrial ecosystems. DDT causes eggshell thinning in birds including peregrines, with a resultant loss of productivity of fledglings, and eventually a reduction in adults available to enter the breeding population. The peregrine declined precipitously in North America following the application of DDT beginning in the 1940s. The California population suffered over a 90% loss of territorial pairs, with a low total known population of two pairs in 1970 where formerly there had been hundreds of known pairs. The Channel Islands population, which historically was was 15-20 pairs, was eliminated by the 1970s.

Restriction of DDT use, and a four million dollar direct intervention restoration management program (including captive breeding and captive incubation of thin-shelled wild eggs), began in the 1970s. Over 700 fledglings were added to the population via fostering, cross-fostering and hacking. This resulted in restoration of the peregrine to much of its former range in California by 1994.

Although peregrines have been recovering in some areas of their range, no recovery was observed in the Channel Islands area until restoration efforts were initiated in the mid-1980s. With hacking, birds of natal origin in the Channel Islands area were established and returned to nest or attract wandering immatures from other areas of the population where productivity was occurring. However, only about one-third of the historical nesting areas have been reoccupied, and the population continues to exhibit the effects of DDT contamination. The intent of this restoration program would be to restore a stable and healthy population of peregrines throughout the Channel Islands.

ECOLOGICAL BENEFITS:

The primary measure of success for this project will be the return of a stable and healthy population of peregrine falcons on all of the Channel Islands. Without the administrative and direct management actions, the recovery period will be considerably longer, possibly decades. With hacking, the rate of recovery of the population will increase and reduce the chances of future extinctions or continued limitation to a reduced population size in the area due to continuing pesticide impacts.

SPECIFIC PROJECTS:

Description:

This report describes the work necessary for restoration of peregrine falcons to the Southern California Bight, including all eight of the Channel Islands. These falcons were eliminated as a breeding population due to DDT induced eggshell thinning and resulting population declines in the 1950s and 1960s. The restoration program described here would continue the recovery effort until a reoccupation of a total of 20 territories on all islands has occurred and a stable population with normal productivity and recruitment has been developed. A monitoring effort is included to determine the success of the restoration effort and to document any future impacts due to pesticides on the recovering population. The peregrine is an effective ecological barometer of the health and pesticide contamination of the aquatic and terrestrial ecosystems of the Channel Islands. Through restoration and monitoring, this species can again become an important part of the ecology of the Channel Islands region.

Achievement of the goal of successful restoration of a stable population of peregrines on the Channel Islands will require several programs in the Southern California Bight over an extended period of years.

In the first few years, three programs need to be completed. First, a restoration management plan for future activities needs to be produced. Second, hacking of young on vacant islands needs to occur. Third, the origin of visiting, wintering peregrines needs to be determined by satellite tracking.

The other necessary programs include ongoing monitoring of the success of these three programs and of the overall restoration. That effort should include: 1) annual surveys of recently utilized territories for occupancy, 2) surveys of historic and suitable habitat to determine newly occupied or currently vacant territories, 3) determination of productivity at occupied territories, 4) marking of nestlings with USFWS and visual identification (VID) bands to chart dispersal and turnover, 5) marking of any unbanded adults with USFWS and VID bands to promote understanding of population dynamics, including territorial movements and mortality, 6) winter monitoring of the population to determine range, prey species utilization and sources of pesticide contamination, 7)

Area: Primary focus would be on birds in the Channel Islands, coastal southern California, and the Big Sur portion of the peregrine falcon's range. Hacking would occur on the four southernmost Channel Islands. With satellite tracking, affects of Southern California Bight pollution on peregrines wintering in the area and then returning to nest outside the area will be monitored.

All proposed programs are covered by existing permits; however, permits and MOUs would likely need to be updated and modified over time. All work would be coordinated by USFWS and CDFG through staff, recovery plans, and Recovery and Working Team meetings. Similar work has occurred in the past, so new laws or policies are not required.

Cost:

Planning: Planning costs for restoration and monitoring work are contained within the operating budget for the twenty year program needed to restore the peregrine and monitor its future status. The costs in current dollars for the initial shorter-term portions of the effort—hacking, management planning, and satellite tracking—are provided in supplements A, B, and C, respectively.

Construction: No construction costs are anticipated.

Operation: The approximate annual budget in current dollars for one of 20 years for restoration and monitoring of status is attached to this report.

Monitoring: This report describes restoration of the peregrine population and the monitoring to determine the success and future impacts of pesticides on the restoration effort. Monitoring costs are thus included in the attached operating budget.

Brian James Walton

A. SUPPLEMENT TO TWENTY-YEAR RESTORATION BUDGET

HACKING ON CHANNEL ISLANDS WITHOUT KNOWN PEREGRINE NESTS

BUDGET:

Salaries:	P.I./Administrator (in 20 year budget)	
	Field Research Tech. (in 20 year budget)	
	Site 1: 2 Hack Site Att. (1000/mo x 2/mo)	4,000
	Site 2: 2 Hack Site Att. (1000/mo x 2/mo)	4,000
	Site 3: 2 Hack Site Att. (1000/mo x 2/mo)	4,000
Benefits:	20% of salaries	2,400
Field Work:	Young Peregrines for Release	18,000
	Hack Site Development (4 towers at $500/ea)	2,000
	Travel (car 11,364 miles at .22)	2,500
Total Direct Costs:		$36,900
UCSC Coordination:	24.4%	9,004
Total UCSC Budget:		$45,904
Agency Coordination and Support: 40% of Total Direct Costs		$14,760
TOTAL BUDGET		$60,664

$60,664 a year for 5 years

C. SUPPLEMENT TO TWENTY-YEAR RESTORATION BUDGET

SATELLITE TRACKING OF WINTER PEREGRINE VISITORS TO CHANNEL ISLANDS

BUDGET:

Salaries:	P.I./Administrator (in 20 year budget) Field Research Coord. (in 20 year budget)	
Benefits:	(in 20 year budget)	
Equipment:	Transmitters (3 at $2,500) Satellite/computer time	7,500 5,000
Travel:	Car (13,636 miles at .22)	3,000
Total Direct Costs:		$15,500
UCSC Coordination:	24.4%	3,782
Total UCSC Budget:		$19,282
Agency Coordination and Support: 40% of Total Direct Costs		$6,200
TOTAL BUDGET		$25,482

$25,482 a year for 2 years

Montrose Settlements Restoration Program
Restoration Project Idea Submittal Form

General Instructions: Please complete the form in the space provided. This information will be used to select and initially evaluate potential restoration projects. Information provided may be made available to the public and respondents are cautioned against including proprietary information. Additional information may be requested of potential projects selected for further evaluation. Completed forms should be **returned by March 19, 2003** to Pam Castens, Montrose Settlements Restoration Program, NOAA; 501 W. Ocean Boulevard, Suite 4470; Long Beach; CA 90802; or by sending a completed electronic file by e-mail to anne_hoecker@r1.fws.gov. An electronic file of this form is available at www.darcnw.noaa.gov/montrose.htm.

Respondent's Contact Information

Name: Jackie Jaakola, Director - Marine Mammal Care Center @ Ft. MacArthur
President - MAR3INE (Marine Animal Rescue, Rehab. & Release Into Natural Env.)

Address:
3601 S. Gaffey St. San Pedro, CA 90731

e-mail: web: www.mar3ine.org
jackjaak@aol.com

Telephone:
310-548-5677

Restoration Project Idea Information

Project Idea Name:
Marine Mammal Monitoring/Sampling Program in the Los Angeles area

List the geographic location(s) where the project would be implemented:
Los Angeles and Ventura Counties

If the project is outside the Southern California Bight, Los Angeles County, or Orange County, briefly explain how it would benefit injured resources and/or lost services (bald eagle, peregrine falcon, marine birds, recreational and subsistence fishing, and the habitat and resources upon which they depend) in the Southern California Bight.

List primary natural resource and/or members of the public that will benefit from the project:
marine mammals and their predators

List secondary natural resources, if any, that will benefit from the project:
the general public

Briefly describe the benefits to natural resources and/or public if the project is implemented.
A baseline of contaminants stored in marine mammals that frequent offshore Los Angeles will be established by implementing a new marine mammal bio-monitoring program. Results will provide insight into the short- and long-term effects of identified man-made toxins including: what prey species of marine mammals carry these contaminants, how fish that are consumed by humans may also be affected, age classes or marine mammals which are affected, how marine mammals are affected. This biomonitoring program can be re-implemented after completion of "clean-up." The results of this program will provide data that can be used to improve public safety in fishing as well as to monitor impacts on prey species (birds) as well as on the marine mammals themselves.

MONTROSE SETTLEMENTS RESTORATION PROGRAM
RESTORATION PROJECT IDEA SUBMITTAL FORM

RESPONDENT'S CONTACT INFORMATION

Principal Investigator:	Pamela K. Yochem
Co-Investigator:	Brent S. Stewart
Address:	Hubbs-SeaWorld Research Institute 2595 Ingraham Street San Diego, CA 92109
Email:	pyochem@hswri.org
Phone:	619-226-3874

RESTORATION PROJECT IDEA INFORMATION

PROJECT TITLE

Enhancement of restoration efforts for Bald Eagles, Peregrine Falcons and seabirds through collection and assessment of pinniped (seal and sea lion) carcasses.

PROJECT GOALS AND OBJECTIVES

The primary goal of this project is to enhance restoration efforts for Bald Eagles, seabirds (e.g., Western Gulls) and Peregrine Falcons that may become exposed to organochlorine compounds by feeding on pinniped carcasses. This exposure may be direct or indirect; an example of the latter is a Peregrine Falcon feeding on a gull that has scavenged a sea lion carcass. Our first objective is to sample and measure organochlorine levels in blood and tissue (including carcasses) from California sea lions, fur seals, harbor seals and northern elephant seals in the Southern California Bight (Channel Islands and southern California mainland [stranded pinnipeds from rescue and rehabilitation facilities]). Our second objective is to document the timing of appearance and fate of pinniped carcasses at these islands.

A secondary goal of the project (and our third objective) is to examine pinniped blood and tissue for evidence of alterations in thyroid hormone and retinoid (Vitamin A) metabolism that may be correlated with exposure to organochlorine pollutants.

GEOGRAPHIC LOCATION

The project would be implemented in the Southern California Bight (Channel Islands and southern California mainland).

NATURAL RESOURCES THAT WILL BENEFIT FROM THE PROJECT

Bald Eagles, Peregrine Falcons and seabirds (e.g., Western Gulls) that directly or indirectly feed on pinniped carcasses are expected to benefit from this research. Pinniped populations (California sea lions, harbor seals, fur seals, elephant seals) also are expected to benefit from this research.

BENEFITS TO NATURAL RESOURCES: PRIMARY

The potential benefit to Bald Eagles, Peregrine Falcons and seabirds is a reduction in continuing exposure to organochlorine compounds in the diet (direct or indirect consumption of pinniped carcasses). Organochlorine loads in pinnipeds in the Southern California Bight have been shown to vary by species and location. By documenting inter-island and island-mainland differences in organochlorine levels in pinniped carcasses, informed decisions can be made about the most desirable locations for expansion of Bald Eagle and Peregrine Falcon reintroduction efforts. By documenting timing of occurrence and fate of pinniped carcasses in these locations, informed decisions can be made about the feasibility of regular carcass removal at reintroduction sites.

BENEFITS TO NATURAL RESOURCES: SECONDARY

The project also provides benefits to pinniped populations in the Southern California Bight by examining the potential relationship between exposure to organochlorine contaminants and disruption of important chemicals (thyroid hormones, Vitamin A) associated with growth, development and general health.

TIME PERIOD RANGE BEFORE BENEFITS WOULD BE MEASURABLE

0 to 3 years

TIME PERIOD RANGE THAT BENEFITS WOULD LAST

>50 years (if maintenance recommendations are adopted)

DESCRIPTION OF KEY ELEMENTS OF THE PROJECT

Objective No. 1: We will sample and measure organochlorine levels in blood and tissue (including carcasses) from sea lions, fur seals, harbor seals and northern elephant seals in the Southern California Bight (Channel Islands and southern California mainland [stranded pinnipeds from rescue and rehabilitation facilities]). Organochlorine pollutants have been shown to vary by species, year and location in California (cf. Calambokidis and Francis 1994, Kajiwara et al. 2001, LeBouef et al. 2002). Therefore it is important to

sample animals at the sites of interest (e.g., possible bald eagle reintroduction site) and to determine the foraging location of animals sampled at these sites to determine whether or not they are likely to be exposed to pollutants associated with the Palos Verdes Shelf.

Objective No. 2: Our second objective is to document the timing of appearance and fate of pinniped carcasses at sites of interest (e.g., possible bald eagle reintroduction sites). We will document the seasonal timing of carcass appearance for sea lions, fur seals, harbor seals and elephant seals, and we will determine the fate of those carcasses by documenting scavenging of carcasses and other sources of loss (e.g., wave action) and by determining how long, on average, carcasses persist on the beach before becoming inaccessible to scavengers (e.g., buried by sand). This will allow us to make predictions about the feasibility of removing carcasses as a means of preventing scavenging by seabirds or Bald Eagles. The project will also document times of greatest risk (i.e., largest number of carcasses present), when carcass removal and/or Bald Eagle diet supplementation (providing "clean" food) might be desirable.

Objective No. 3: A secondary goal of the project (and our third objective) is to examine pinniped blood and tissue for evidence of alterations in thyroid hormone and retinoid (Vitamin A) metabolism that may be correlated with exposure to organochlorine pollutants. Rolland (2000) reviewed evidence for alterations in thyroid hormone and vitamin A status in wildlife caused by environmental contaminants. She concluded that a direct causal relationship has not been established, due in part to a lack of concurrent analysis of other factors (e.g., age, sex, season, physiological condition) known to influence thyroid hormone and retinoid metabolism. We will examine thyroid glands and measure thyroid hormones and Vitamin A in the blood of animals sampled during this project in order to further investigate their usefulness as biomarkers of organochlorine exposure.

PROJECT METHODOLOGY

This project will employ proven technologies of blood and tissue evaluation (e.g., measurement of organochlorine compounds, thyroid hormone and Vitamin A levels in blood and tissue) and monitoring of pinniped movements (e.g., satellite telemetry).

FACTORS THAT COULD AFFECT THE SUCCESS OF THE PROJECT

DDT and/or PCB contaminated food source

Human disturbance

Other contaminants

IMPLEMENTATION PHASES THAT WILL REQUIRE MEASURES TO AVOID ENVIRONMENTAL IMPACTS

Handling and possible incidental disturbance of pinnipeds during all phases of this research will require a permit under the Marine Mammal Protection Act.

WOULD THE PROJECT RESULT IN A RISK TO PUBLIC HEALTH OR SAFETY?

No.

ESTIMATED COST RANGE

Objective No. 1: $500,000 - $1,000,000 over three years

Objective No. 2: $100,000 - $500,000 over three years

Objective No. 3: $100,000 - $500,000 over three years

OTHER POTENTIAL SOURCES OF FUNDING

As proposed, this project would benefit from cost-sharing with existing Hubbs-SeaWorld Research Institute research programs on pinniped populations in the Southern California Bight.

OPPORTUNITIES FOR VOLUNTEER INVOLVEMENT

Yes, during implementation and monitoring.

REFERENCES

Calambokidis, J. and J. Francis. 1994. Marine mammal exposure to PCB and DDT contamination in the Southern California Bight. Final Report under subcontract 178-02, Task Order 50017 from Industrial Economics, Inc. for Contract No. 50-DGNC-1-00007 from the National Oceanic and Atmospheric Administration. 100p.

Kajiwara, N. and 10 others. 2001. Organochlorine pesticides, polychlorinated biphenyls, and butyltin compounds in blubber and livers of stranded California sea lions, elephant seals, and harbor seals from coastal California, USA. Archives of Environmental Contamination & Toxicology 41:90-99.

LeBoeuf, B.J. and 5 others. 2002. Organochlorine pesticides in California sea lions revisited. BMC Ecology (online). http://www.biomedcentral.com/1472-6785.

Rolland, R.M. 2000. A review of chemically-induced alterations in thyroid and Vitamin A status from field studies of wildlife and fish. Journal of Wildlife Diseases 36:615-635.

Received 08/05/03

From: Kate Faulkner
National Park Service
805-271-4848
Kate_Faulkner@nps.gov

Title: **Expand monitoring of seabird populations at the northern Channel Islands**

Project Description:

Seabirds in the SCB experienced considerable eggshell thinning and population declines due to DDE and PCBs. California brown pelicans, cormorants, alcids, gulls, and storm-petrels were some of the seabirds affected. The majority of the seabirds in the SCB nest on the five northern Channel Islands within Channel Islands National Park and Marine Sanctuary. Site-specific and species-specific restoration efforts may be funded by the Montrose Settlements Restoration Program. An assessment of the health of seabird populations and the benefits and impacts of restoration projects will require monitoring of seabird populations. This would be done most effectively at nesting colonies. There is a long-standing Seabird Monitoring Program at Channel Islands National Park that is a collaboration of federal, state, university, and non-profit partners. This program has collected standardized population data on twelve species of seabirds and provides a very solid dataset for assessing population trends. However, there are gaps in the program for selected geographic areas and species. Expansion of seabird monitoring to fill the data gaps would provide a greatly enhanced opportunity to evaluate population trends and assess the benefits of restoration activities funded by the Montrose Settlements Program.

April 14, 2003

Pam Castens, Program Manager
Montrose Settlements Restoration Program (MSRP)
NOAA, 501 W. Ocean Blvd., Ste. 4470
Long Beach, CA 90802

Re: Seabird Restoration Project Ideas

Dear MSRP Trustees,

We attended the January 2003 MSRP scoping meeting in Sacramento, and would like to thank the Trustee council for making this process open and accessible to us for review and input. We believe that local community support, collaborations with experts in the fields of seabird ecology, raptor biology, ichthyology, marine science, and restoration ecology, will ultimately help you achieve the goals "to restore natural resources injured by chronic releases of DDT and PCBs into the Southern California marine environment". We present the following additional comments, concerns, and ideas for your review. Our comments are specifically directed toward restoration efforts for injuries to seabirds.

First, we suggest the Trustees consider the priorities for **seabird conservation** set by an international council of seabird specialists listed below[1].

1) **Conduct surveys and censuses of seabird colonies (esp. rare species) to establish information necessary to detect baseline trends in populations**
2) **Eliminate alien species from nesting islands**
3) **Establish new and improve existing reserves**
4) **Prevent or reduce habitat disturbance and destruction**
5) **Protect seabirds from over-exploitation**
6) **Educate the public and publicize seabird related issues**
7) **Establish and provide legal protection**
8) **Continue applied research**

To restore seabird populations affected by toxic pollutants, it may be necessary to mediate other threats to the population (e.g. fishery by-catch, oil pollution, introduced predators). Because seabirds are long-lived with high adult survival, reducing mortality factors which target adult birds will be the most successful means to increase the long-term viability of the affected populations.

Seabird population enhancement may require a combination of efforts. We suggest that projects considered within the MSRP incorporate aspects from the priorities listed above. Whereas education and research are often treated as separate and isolated activities not related to 'restoration' efforts, we suggest that both components are integral to the

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[1] International Council for Bird Preservation (ICBP) Seabird Specialist Group 1984 Priorities for seabird conservation and associated research (Tech. Pub. No. 2, p. 771-778)

success of restoration, and should be included in final restoration plans. Without good education the public will remain uninformed and uninterested in seabird conservation and restoration. Without good research, population censusing, monitoring, we cannot evaluate population trends, and determine threats and negative impacts to mediate. Nor can we measure the effectiveness of our restoration efforts.

The dumping and flushing of DDT, and PCBs off Los Angeles affected marine birds at a geographic scale that extends beyond the Southern California Bight. Toxic pollutants off Southern California affected both resident and migratory marine birds, and may have contributed to the decline of species that breed in other states (e.g. Northern Fulmar, Alaska; Black-footed Albatross, Hawaii) and other countries (White-winged and Surf Scoter, Canada; Black-vented Shearwater, Mexico, Pink-footed Shearwater, Chile; and Sooty Shearwater, New Zealand).

Several seabirds that breed within the Southern California Bight (SCB) have undergone population declines or have significant threats to their breeding habitat, and therefore are of particular concern. These include the Ashy Storm-petrel, Xantus's Murrelet, and Brown Pelican. For these species it is essential to conduct at-sea and colony surveys to establish information necessary to detect baseline trends in populations and contaminants.

A comprehensive seabird monitoring program would make multi-project planning and implementation cost-effective and streamlined. There are several California-based seabird experts and conservation organizations which have successfully implement monitoring and restoration plans. It is important to draw upon these knowledgeable resources to implement proposed seabird projects. Seabird groups include the USGS Western Ecological Field Station (John Takekawa), PRBO Conservation Science, Island Conservation Group (), Oikonos Ecosystem Knowledge. Within these groups are seabird specialists experienced in field operations, monitoring and restoration activities. There are also seabird researchers in California including Harry Carter, and David Ainley who could provide professional consultation on project ideas. Persons at academic institutions include Dan Anderson and Eduardo Palacios (UC Davis), Don Croll (UC Santa Cruz), James Harvey (Moss Landing Marine Laboratories) and others.
We suggest that these persons be contacted to evaluate proposed project ideas. It is necessary to have a peer-reviewed process of screening projects to ensure non-biased and scientifically sound methods for restoration activities and effectively measuring the results.

To summarize our comments, we suggest that the MSRP should strive to integrate the ICBP's priorities into all proposed work. Due to the highly transitory nature of pelagic seabirds of California, a well-thought out plan will incorporate local and international efforts to reduce mortality factors (e.g. bycatch, oiling, harvest, introduced species) affecting seabirds populations. Such a plan will help to effectively restore, rehabilitate, replace or acquire the equivalent of the damages done to the California seabird populations and important migratory species affected by the Montrose *et al.* dumping and flushing of DDT and PCBs into the SCB.

Thank you for considering our comments and opinions. Should you have any questions or comments, we would appreciate further communication on the important issue of seabird restoration efforts related to the MSRP.

Sincerely,

Josh Adams
Seabird Biologist, USGS-WERC, josh_adams@usgs.gov

Hannah Nevins
Moss Landing Marine Laboratories, Moss Landing, CA 95039 hnevins@hotmail.com
and Oikonos Research Group, Bolinas, CA 94950 www.oikonos.org

The following is a short list of project ideas. Because there

1) **Conduct surveys and censuses of seabird colonies (esp. rare species) to establish information necessary to detect baseline trends in populations**

Ashy Storm-petrel *Oceanodroma homocroa*
Nocturnal colony attendance, inaccessible nesting habitat, and wide dispersal at sea often far from the coast, make population trends in this species extremely difficult to monitor. McIver (2002 MS Thesis) contributed significant data regarding the breeding biology of Ashy Storm-petels nesting in the caves of Santa Cruz Island. Extensive mist-netting and banding conducted in the early 1990s (Carter et al. unpublished data) should be re-established. Band recoveries from the Farallon Islands of birds mist-netted in the Channel Islands suggest a linkage between these sub-populations separated by 600 km. Mark-recapture techniques may provide the only meaningful way to determine population trends for this species. Levels of DDE and PCBs from this long-lived species have not been reported and comprehensive toxicological knowledge is lacking. Population monitoring should continue and include examination of diet to elucidate trophic-contaminant pathways, and to examine contaminant levels in eggs collected in the Channel Islands, and at the Farallones. Comprehensive monitoring of this species would permit regional comparison, allow population monitoring, and establish contaminant levels and pathways (diet) prior to such mitigation measures as sediment capping.

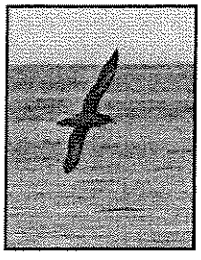
Xantus's Murrelet *Synthliboramphus hypoleucus*
Nocturnal colony attendance, inaccessible nesting habitat (rocky crevices), and wide dispersal at sea often far from the coast, make population trends in this species extremely difficult to monitor. Chicks leave nest at 2-4 days after hatching. Carter et al. (unpublished data and continuing survey efforts) have made significant progress in determining trends and patterns in the occurrence of Xantus's Murrelets off Santa Barbara Island, and Anacapa Island. Whitworth et al. (2000) and USGS (in progress) measured the at-sea distribution of radio-marked Xantus's Murrelets. Surveys and methods for the quantification of population trends in this species should be improved and continued. Detection of the post-rat eradication effect on the Xantus's Murrelet population will require extended monitoring of this species. As a potentially important diet item for Peregrine Falcon, contaminant levels should be measured and include examination of murrelet diet to elucidate trophic–contaminant pathways. Continued habitat restoration to provide additional nesting habitat for this species could be achieved by promoting re-vegetation of native plant species at sites known to provide nest-sites for murrelets (i.e., Scorpion Rock, Santa Barbara Island, Anacapa Island).

2) Eliminate alien species from nesting islands

Scorpion Rock restoration. Scorpion Rock, off Santa Cruz Island is one of only a few nesting islands available to burrow-nesting seabirds in California. This small islet is under the jurisdiction of the National Park Service and is identified as a National

Monument. Scorpion Rock supports a diverse community of seabirds, and could be improved as seabird habitat by restoring vegetation to the main islet. Elimination of invasive plants and restoration of native plants will benefit burrow-nesting species, by providing increased habitat and stabilization of the rapidly eroding soil horizon. This project would directly benefit the following nesting species: Cassin's Auklet, Ashy Storm-petrel, Xantus's Murrelet and potentially Brown Pelican, Double-crested Cormorant, and Rhinoceros Auklet. The restoration of this island would complement and mutually benefit the CINP island vegetation restoration program, interpretation program, ongoing seabird research and monitoring, and promote seabird education. Cassin's Auklet was monitored at Scorpion Rock during 2000 and 2001. Monitoring at Scorpion and Prince during these years demonstrated the effective use of novel artificial burrows to enhance degraded nesting habitat, and facilitate monitoring for this species in the Channel Islands (USGS unpublished data). These sites are now being monitored by the CINP, and could be used in conjunction with native plant restoration as a complementary method to restore, and enhance Scorpion Rock thereby creating a significant breeding colony for Cassin's Auklets, and potentially Rhinoceros Auklets and Xantus's Murrelets.

Migratory Species



One of the dilemmas associated with identifying appropriate restoration actions by the MSRP, is the extreme lack of information regarding the effects that were incurred by both resident and non-resident marine bird species. This information is required in order to identify specific impacts to be mitigated through effective restoration.

Shearwaters— Four species of shearwater inhabit the waters of the Southern California Bight throughout a significant portion of the year. The Sooty Shearwater is by far the most abundant.

Sooty Shearwater abundance has declined significantly off California in recent decades. During their stay off California shearwaters feed on abundant euphausiids, juvenile rockfishes, and rely especially on anchovies prior to migration and nesting. Anchovies are the predominant prey species for nesting Brown Pelican in the SCB, and served as the trophic link in the transfer of DDT and DDE to this species, causing dramatic reproductive failure and population decline. Therefore, it is assumed that Sooty Shearwaters off California were, and continue to be exposed to high concentrations of DDT and its break-down components. The effect of DDT contamination on the survival and reproduction of Sooty Shearwater was never documented. Sooty Shearwater collected off Japan showed relatively high concentrations of DDE. Whereas Sooty Shearwater also nest Chile and Tasmania, the populations that rely on the food resources of the SCB, are not specifically known.

The Black-vented Shearwater is restricted to several islands off Mexico, also has a low total population size, and is affected by introduced predators. Similar to Sooty

Shearwater, Black-vented also rely seasonally on the abundant and potentially contaminated food resources of the SCB. Additionally, the Pink-footed Shearwater is considered globally threatened. It nests in reduced numbers only on several islands off Chile. Pink-footed Shearwater is vulnerable to introduced predators, human consumption, and habitat destruction.

Effective seabird restoration could be achieved by allocating funds to help remove introduced competitors and predators at shearwater colonies in Mexico, New Zealand, and Chile. In addition, seabird conservation efforts will benefit by establishing and funding educational outreach and community involvement related to restoration efforts, not only in Mexico, New Zealand, and Chile, but here in California as well.

We support allocation of funds to help eradicate introduced predators on seabird colonies to help restore populations in Mexico, New Zealand and Chile. We would also support funding for education and community outreach in these countries and in here California regarding the importance of our coastal marine ecosystem to a large number of migratory species. Along these lines, Moller et al. (2003) have identified Sooty Shearwater colonies in New Zealand that are impacted by introduced ship rats (*Rattus rattus*) and have drafted a complete eradication/restoration plan designed to recover the loss of adult Sooty Shearwaters killed during the 1998 *Command* oil spill. Similar eradication/restoration plans could be drafted and applied toward these same colonies and toward colonies in Mexico (Black-vented Shearwater) and Chile (Pink-footed Shearwater) to remove non-native predators, and thus recover losses incurred by or equivalent to losses from environmental contamination associated with DDT in the SCB. Furthermore, toxicological monitoring of the migratory species listed above provides the MSRP Trustees with potentially useful seabird bio-indicators that could be used to detect the effect of dump-site mitigation on the flux of DDE and PCBs to the ecosystem.

Surf Scoter *Melanitta perspicillata*

The Surf Scoter is one of the most abundant marine migratory bird species inhabiting the most contaminated area of the SCB. In costal areas with sandy bottoms, principal scoter prey includes the common, particulate filter-feeding crustacean, the Pacific Mole Crab *Emerita analoga*. Mole crabs are consumed heavily by bottom-feeding fishes such as white croaker, flat-fishes, skates and rays, and also by multiple species of migratory shore birds, and Heermann's Gull. DDT residues in *E. analoga* near the Los Angeles County sewer outfall contained over 45 times more DDT (mostly in the form of DDE) derivatives than animals near major agricultural drainage areas. Surf Scoter, and the related Black Scoter and White-winged Scoter have declined throughout their range during recent decades. The winter foraging ecology and toxicology associated with winter foraging areas and diet is part of an ongoing study by USGS researchers. During the next several years the USGS will be assessing the role of toxic pollutants as a potential factor in the decline of Surf Scoters wintering in the San Francisco Bay. Because *E. analoga*, is a key trophic-link at the base of the food web responsible for the mobilization and transfer of DDT compounds to higher trophic levels, the MSRP is urged to continue studies of this important chemical pathway. The MSRP should consider supporting complementary

research designed to identify levels of DDT and PCBs in both *E. analoga* and Surf Scoter from within the contaminated nearshore SCB area, for comparison to existing data collected from scoter in San Francisco Bay. Furthermore, the winter residence-time (exposure to contaminated food-sources) and population source for the scoters wintering in the SCB should be identified using identical telemetry methods being conducted in the San Francisco Bay study. This is required to help identify population-specific recovery efforts that could potentially aid in recovery of this species.

Seabird Disturbance. Disturbance to seabird nesting colonies is a continuing and possibly an increasing threat to California seabirds. Plane, helicopter, boater, and pedestrian disturbance can be mediated through public outreach, publicity and education. In addition, seabirds will benefit through the establishment and enforcement of 'no-fly' zones, and marine and costal buffer areas at important roosting and nesting areas. We support actions to minimize disturbance of colonies, offshore, and beach roost-sites by humans and elimination of introduced predators at these sites.

State and County Parks throughout California could benefit seabirds (and other native species, i.e., Snowy Plover) by ensuring that all trash containers are outfitted with covers. This would decrease the dependence of gulls on trash as a food source, reduce the flux of plastic to the ocean and other marine organisms that subsequently feed on this plastic, and reduce the negative impacts caused by enhanced populations of native (ravens) and non-native (rats, red fox, feral cats) predators. DDE and PCBs are concentrated above ambient levels by orders of magnitude on floating plastic particles that are taken in large quantities as food by seabirds *i.e.*, fulmars, albatrosses, and storm-petrels. We support allocation of funds to ensure that trash on beaches, and industrial pre-processed plastic, and plastic waste in coastal areas is contained.

Beach Survey Program

Beach survey programs are relatively

COASTAL GILL NET FISHERIES OBSERVER PROGRAM.

Proposal:

Seabird Egg Residue Data Gap Study

Submitted to:

Montrose Settlements Restoration Program
501 W. Ocean Boulevard, Suite 4470
Long Beach, CA 90802

Attn: Pam Castens, MSRP Program Manager

Submitted by:

D. Michael Fry
Department of Animal Science
University of California
Davis, CA 95616
dmfry@ucdavis.edu

January 20, 2003

This submission is a preliminary proposal. A formal proposal will be submitted through the Office of the Vice Chancellor of Research, University of California, Davis.

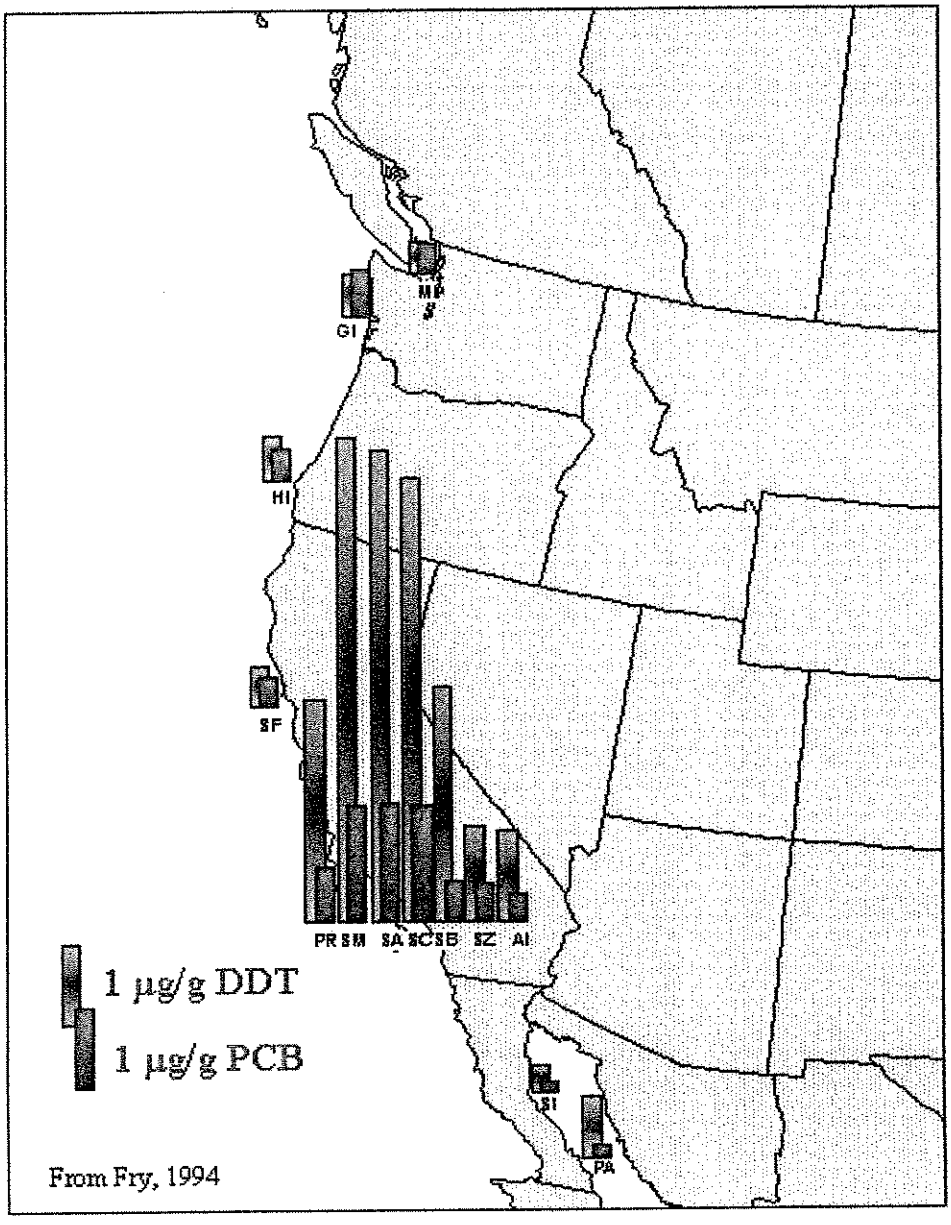


Figure 1. Total DDT and PCB Residues in Gull Eggs in 1992

Gulls obtain contaminants from fish, as well as from carcasses of marine mammals, and from invertebrates in the intertidal environment. Documentation of continued contamination will be necessary for assessing the recovery potential and timeline for Bald Eagles, which consume gulls as a regular portion of their diet. Eagles also consume marine mammal carrion. The gull egg residues, especially from colonies on San Miguel Island, will be excellent bioindicators of continued food web contamination.

Double-crested cormorants migrate along the Pacific Coast during the non-breeding season, and higher than expected levels of DDT in Northern California colonies are thought to be a result of foraging in the SCB.

Figure 3 shows Storm-petrel data from four colonies, with the highest contamination at Santa Cruz Island in the SCB, and significant contamination at Southeast Farallon Island. Colonies of storm petrels in Oregon and British Columbia were comparatively clean.

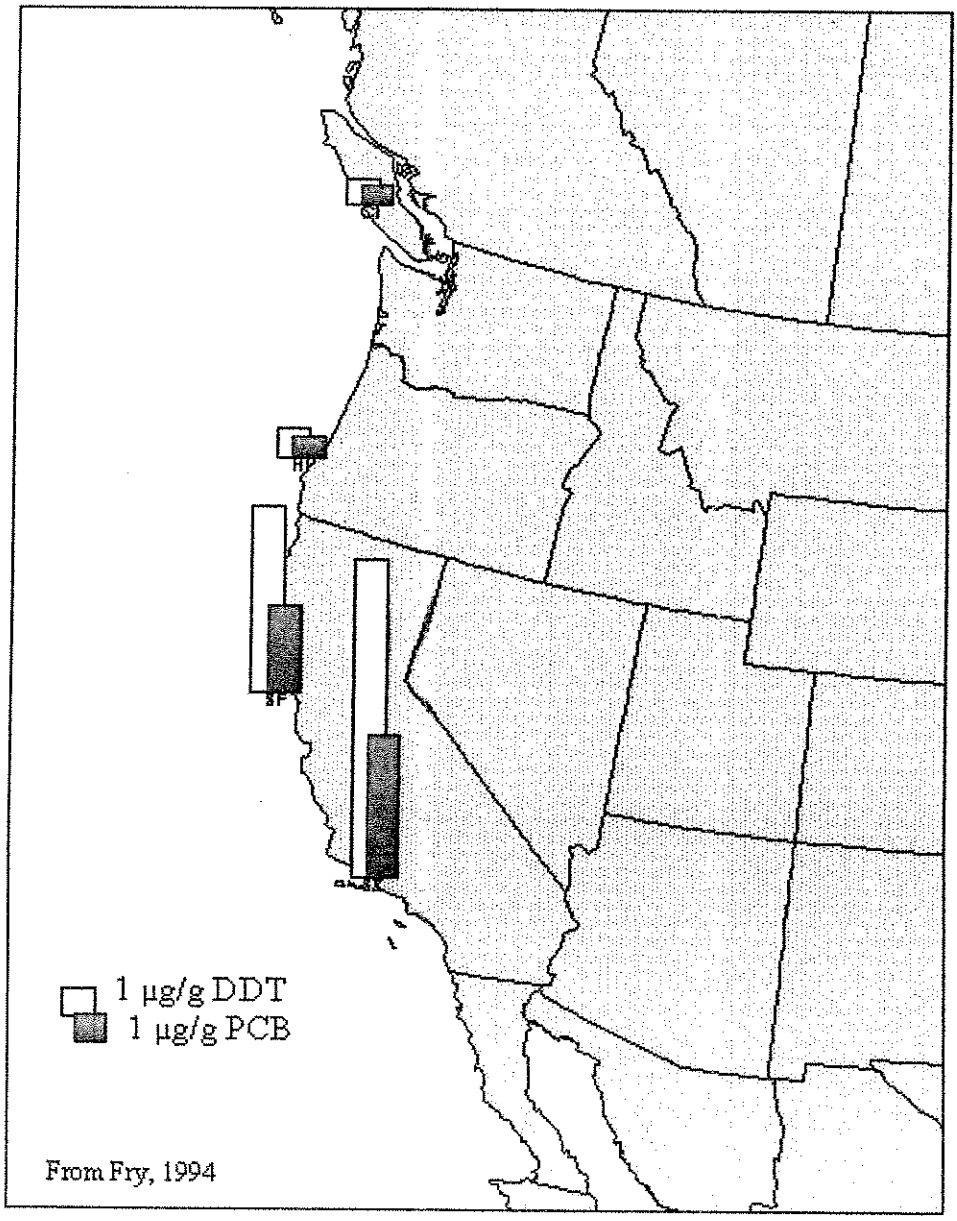


Figure 3. Total DDT and PCB Residues in Storm-petrel Eggs in 1992

Egg collections of a limited number of species from selected California colonies identified in 1992 as contaminated should be repeated in 2003 to establish a baseline for recovery of migratory birds impacted by the DDT and PCB contamination in the SCB. Collection of eggs from selected migratory seabirds outside the SCB is important for documentation of reduced contamination in these birds that forage in the SCB part of the year. The parallel reduction in contaminants in eggs from these colonies would confirm the connection to the SCB, if contaminant levels remain proportional to levels at these geographically separated colonies in 1992.

A limited collection of Pigeon Guillemot eggs is also proposed for this study. The levels of DDT were twice as high in eggs from Santa Cruz Island compared to Southeast Farralon Island, (Table 1) and this species is thought to be local in its migratory movements. This species should serve as a reference both for reduction of contamination in the SCB, and as a reference for Storm-petrels and cormorants migrating from Northern California.

Goals of the Proposed Study:

The overall goal is to determine the current baseline DDT and PCB contamination in seabirds in the SCB, and to compare those levels with residues in the 1992 dataset.

Specific goals are:

1. Collect 6 eggs from Western gulls at each colony in the Channel Islands that was surveyed in 1992 (12 eggs were collected from all colonies in 1992, but 6 should be adequate to document current exposure). Eggs were collected from San Clemente, San Nicholas, Santa Catalina, Santa Barbara, Anacapa, Santa Cruz, San Miguel, and Prince Islands. Because egg reside levels were quite different from each colony, it is important to repeat the collections of 1992, to determine the spatial differences for this species within the SCB.
2. Collect Double Crested Cormorant eggs from Santa Barbara and Anacapa Islands, and from Morro Rock and Russian River Rocks, to determine the relative contamination within the SCB and for migratory birds that use the SCB during the non-breeding seson.
3. Collect eggs from Ashy Storm Petrels from Santa Cruz Island and from Southeast Farallon Island.
4. Collect Brown Pelican eggs from the colony at Anacapa Island.
5. Collect Pigeon Guillemot eggs from the colony at Santa Cruz Island, and compare them with eggs from SEFI.
6. Transport and handle 2 chicken eggs as reference blanks at each colony.
7. Measure eggshell thickness of all eggs (except reference blanks), and compare shell thickness with eggs collected from the same colonies in 1992. Compare thickness of these eggs with the historical reference eggs measured in 1992.
8. Collect contents of all eggs, and determine the residue levels of tDDT and PCBs. Analysis of eggs: CAHFS UCD, or GERG. CAHFS will provide QA/QC records equivalent to the 1992 data.
9. Prepare a report of findings, to be used as a baseline reference for Montrose Restoration Projects.

TABLE 1: 1992 DDT AND PCB RESIDUE DATA FROM SEABIRDS ALONG THE PACIFIC COAST

ISLAND	SPECIES	NUMBER OF EGGS	TOTAL DDT geometric mean	(95% C. L.)	TOTAL PCBs geometric Mean	(95% C. L.)
I. Partida	Yellow-footed Gull	5	0.77	(1.32- 0.45)	0.16	(0.24- 0.11
I. San Luis	Yellow-footed Gull	7	0.36	(0.62- 0.21)	0.13	(0.33- 0.05
San Clemente I.	Western Gull	13	5.54	(7.47- 4.10)	1.45	(1.80- 1.17
San Nicolas I.	Brandt's Cormorant	15	0.70	(0.99- 0.50)	0.36	(0.47- 0.28
Santa Catalina	Black Oystercatcher	3	0.54	(0.76- 0.39)	0.14	(0.16- 0.12
	Western Gull	12	5.88	(7.49- 4.62)	1.48	(1.79- 1.22
Santa Barbara	Brown Pelican	1	2.77		0.97	
	Double-c. Cormorant	4	1.11	(1.58- 0.78)	0.29	(0.37- 0.24
	Western Gull	10	2.92	(3.41- 2.50)	0.49	(0.63- 0.39
	Xantus'Murrelet	15	0.86	(1.01- 0.72)	0.35	(0.39- 0.31
Anacapa I.	Brown Pelican	14	2.29	(2.92- 1.80)	0.96	(1.48- 0.63
	Double-c. Cormorant	13	5.86	(9.27- 3.70)	1.61	(3.15- 0.83
	Western Gull	12	1.13	(1.41- 0.91)	0.33	(0.39- 0.28
Santa Cruz I.	Ashy Storm-petrel	14	11.36	(14.37- 8.98)	5.10	(6.19- 4.21
	Black Oystercatcher	7	0.35	(0.55- 0.22)	0.09	(0.12- 0.07
	Western Gull	12	1.16	(1.38- 0.98)	0.47	(0.51- 0.42
	Cassin's Auklet	5	1.35	(1.52- 1.19)	0.25	(0.30- 0.21
	Pigeon Guillemot	12	1.07	(1.27- 0.90)	0.33	(0.41- 0.27
San Miguel I.	Pelagic Cormorant	13	1.09	(1.51- 0.79)	0.38	(0.53- 0.28
	Black Oystercatcher	2	0.39	(2.20- 0.07)	0.04	(0.06- 0.04
	Western Gull	8	6.05	(10.77- 3.40)	1.46	(2.63- 0.81
Prince I.	Western Gull	2	2.76	(4.13- 1.85)	0.67	(0.75- 0.59
	Cassin's Auklet	8	1.11	(1.39- 0.88)	0.21	(0.25- 0.18
Morro Rock	Double-c. Cormorant	12	2.60	(3.57- 1.90)	0.79	(1.26- 0.50
S.E. Farallon I.	Ashy Storm-petrel	1	6.66		3.14	
	Brandt's Cormorant	12	0.79	(1.06- 0.59)	0.69	(1.03- 0.46
	Western Gull	8	0.52	(0.70- 0.39)	0.37	(0.48- 0.29
	Pigeon Guillemot	15	0.45	(0.52- 0.40)	0.22	(0.24- 0.21
Russian River R.	Double-c. Cormorant	12	2.04	(2.64- 1.58)	2.27	(3.54- 1.46
Humboldt Bay	Double-c. Cormorant	12	1.92	(3.41- 1.09)	0.94	(1.41- 0.63
Hunters I.	Leach's Storm-petrel	12	1.01	(1.15- 0.88)	0.72	(0.80- 0.65
	Double-c. Cormorant	12	1.15	(1.52- 0.88)	0.77	(1.20- 0.50
	Western Gull	12	0.56	(0.76- 0.41)	0.41	(0.54- 0.30
Coos Bay	Pigeon Guillemot	10	0.48	(0.81- 0.29)	0.35	(0.42- 0.29
Goose I.	Glaucous-w. Gull	12	0.53	(0.81- 0.35)	0.58	(0.69- 0.49
Mandarte I.	Double-c. Cormorant	12	0.42	(0.63- 0.28)	1.86	(3.37- 1.03
	Glaucous-w. Gull	12	0.38	(0.54- 0.26)	0.36	(0.49- 0.26
Cleland I.	Leach's Storm-petrel	12	0.86	(1.16- 0.64)	0.62	(0.80- 0.48

Budget:

Personnel		
Fry	9 months at 50% time	$26,250
Assistant	6 months at 33% time	4,800
Climber for Morro rock and Russian River Rocks		700
Benefits	25% of salary for PI and Assistant	7,762
Travel and collection costs		
UCD motor pool or private car mileage: 4500 miles @0.36/mile		1,500
4 trips to Channel Islands NP		
2 trips to PRBO		
1 trip each to Morro Rock, Russian River Rocks		
Per Diem and lodging costs: 12 days and nights		1,800
Subcontractors:		
Point Reyes Bird Observatory (SEFI)		400
Preparation and Analysis costs		
Prep supplies, glassware, solvents		6600
Analytical Costs:		
DDT and PCB analysis of 136 eggs		
CAHFS: $250/sample ($34,000)		
GERG: $350-400/sample, depending on the QA/QC		
Requirements and data package ($47,600-54,400)		(50,000)
Laboratory supplies and operating expenses		
Phone, computer software, chemical disposal		2,000
Data Analysis, presentation of results, and publication		2,500
Total Direct Costs		$54,312
Indirect costs	48.5% of total direct costs	$26,341
Total Costs	NOT INCLUDING GC ANALYSIS OF EGGS	$80,624

Egg analysis probably about $50,000 for the detection limits needed (1 ng/gm)

To: Annie Hoecker, USFWS/MSRP
From: Laird Henkel, H.T. Harvey & Associates, Ecological Consultants.
RE: Project ideas for MSRP.

15 April, 2003

Annie:
Thank you for the opportunity to comment on MSRP project ideas. I believe that the following project is a crucial first step in the MSRP project planning process:

Analysis of Impacts to Seabirds from Chronic Releases of DDT and PCBs into the Southern California Marine Environment.

Proposals for restoration of damaged seabird populations cannot be assessed without an analysis of damage. Perhaps this analysis was completed for the legal case against Montrose, but if so, it was not made available for this pre-proposal process. This analysis should be based on estimates of exposure risk of each seabird species to contaminants since the late 1940's. A fairly straightforward analysis could be based on: 1) spatial distribution of each species in the Southern California Bight, 2) temporal patterns of abundance of each species, and 3) diet of each species. Data on spatial distribution should be available from MMS-sponsored aerial surveys and other at-sea surveys. Data on temporal abundance should be available from various sources, including at-sea surveys. Data on diet should be available from a variety of published and unpublished sources.

For example, Surf Scoters (*Melanitta perspicillata*) occur in winter, occur in the nearshore environment (typically within 1 km of shore), and feed on *Emerita analoga* and bivalves. In contrast, Cassin's Auklets (*Ptychoramphus aleuticus*) occur year-round, occur farther offshore, and feed on pelagic crustaceans (e.g., krill) and larval fish. Damage to these species was likely very different. In addition, abundance varies greatly by species. These factors should be considered when considering how to allocate funds for restoration of seabird populations in the Southern California Bight or elsewhere. The cost of this analysis would depend on the level of effort, but could likely be completed fairly inexpensively.

Again, thank you for the opportunity to comment on the MSRP.

Sincerely,
Laird Henkel

H.T. Harvey & Associates
Ecological Consultants
294 Green Valley Road, Suite 320
Watsonville, CA 95076
(831) 786-1700 ext. 104
Lhenkel@harveyecology.com

04/14/03

From: Josh Adams
US Geological Survey
831-771-4422
josh_adams@usgs.gov

Full text of letter can be found with other submission for "Seabird Monitoring" within the Data Gap ideas.

Surf Scoter *Melanitta perspicillata*

The Surf Scoter is one of the most abundant marine migratory bird species inhabiting the most contaminated area of the SCB. In costal areas with sandy bottoms, principal scoter prey includes the common, particulate filter-feeding crustacean, the Pacific Mole Crab *Emerita analoga*. Mole crabs are consumed heavily by bottom-feeding fishes such as white croaker, flat-fishes, skates and rays, and also by multiple species of migratory shore birds, and Heermann's Gull. DDT residues in *E. analoga* near the Los Angeles County sewer outfall contained over 45 times more DDT (mostly in the form of DDE) derivatives than animals near major agricultural drainage areas. Surf Scoter, and the related Black Scoter and White-winged Scoter have declined throughout their range during recent decades. The winter foraging ecology and toxicology associated with winter foraging areas and diet is part of an ongoing study by USGS researchers. During the next several years the USGS will be assessing the role of toxic pollutants as a potential factor in the decline of Surf Scoters wintering in the San Francisco Bay. Because *E. analoga*, is a key trophic-link at the base of the food web responsible for the mobilization and transfer of DDT compounds to higher trophic levels, the MSRP is urged to continue studies of this important chemical pathway. The MSRP should consider supporting complementary research designed to identify levels of DDT and PCBs in both *E. analoga* and Surf Scoter from within the contaminated nearshore SCB area, for comparison to existing data collected from scoter in San Francisco Bay. Furthermore, the winter residence-time (exposure to contaminated food-sources) and population source for the scoters wintering in the SCB should be identified using identical telemetry methods being conducted in the San Francisco Bay study. This is required to help identify population-specific recovery efforts that could potentially aid in recovery of this species.

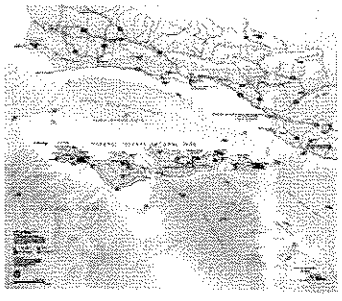
Population Status and Ecology of Ashy Storm-petrels in Channel Islands National Park: assessing one of the most vulnerable endemic seabirds in the California Current

Abstract. Channel Islands National Park (CINP) supports a large and diverse number of breeding seabirds. However, seabird populations within the southern portion of the California Current are adversely affected by threats to terrestrial habitats (*e.g.* human development and disturbance, introduced predators) and at-sea habitats (*e.g.* fishing practices, pollution, Navy maneuvers). Islands within the CINP provide essential nesting habitat for key species such as the Xantus's murrelet (*Synthliboramphus hypoleucus*), Cassin's auklet (*Ptychoramphus aleuticus*), and ashy storm-petrel (*Oceanodroma homochroa*), but these species are also highly dependent on marine prey resources located in surrounding waters. Basic data are lacking on storm-petrel populations, diet, and oceanographic habitats. Thus, we propose to build on previous storm-petrel studies in CINP to examine these data gaps. We will use archived datasets, ongoing CINP seabird monitoring and restoration efforts, surveys, and capture and marking studies to: (1) summarize the population status of ashy storm-petrels in the CINP and recommend a monitoring strategy, (2) evaluate their diet during the breeding season, and (3) describe their island attendance patterns and at-sea distribution.

USGS principal contacts: Joshua Adams (Contract Seabird Biologist) and John Y. Takekawa (Wildlife Research Biologist), WERC, San Francisco Bay Estuary Field Station, 505 Azuar Drive, Vallejo, CA 94592, tel:707/562-2000, fax:707/562-3001, email:john_takekawa@usgs.gov

Problem statement/justification

Need: Seabird monitoring on Channel Islands National Park (CINP) islands has generated important long-term datasets on reproductive success of key seabird species (i.e., brown pelican *Pelecanus occidentalis*, Xantus's murrelet, western gull *Larus occidentalis*), but these datasets are primarily limited to Santa Barbara and Anacapa Islands (CINP 2003). Although much is known about the ecology of several seabird species in CINP, virtually nothing is known about the ecology of the ashy storm-petrel. The ashy storm-petrel is an extremely vulnerable species endemic to islands in California and a few adjacent mainland sites (Ainley 1995, Brown et al. 2003). The world breeding population has been estimated at 7,500 birds (Carter et al. 1992), but the species has undergone a dramatic 30-year decline at its largest colony in the Farallon Islands (Sydeman et al. 1998). The Ashy storm-petrel is listed by the IUCN as "near threatened" (Bird Life International 2000) and is a species of concern for the U. S. Fish and Wildlife Service (FWS) and the California Department of Fish and Game (CDFG). On the basis of its life history traits, small and poorly understood population status, and threats both at colonies and at sea, it is a likely candidate for listing. Most of the breeding birds in the Southern California Bight (SCB) are found on islands managed by the CINP. Thus, a better understanding of their population size, food resources, and distribution will be critical background for CINP management actions to protect or enhance their populations.



Background: The SCB region supports extensive populations of resident breeding and non-resident migratory seabirds (Carter et al. 1992). CINP provides breeding habitat for at least 11-12 species of seabirds (Carter et al. 1992) and hosts some of the largest seabird breeding colonies in California. The region is used extensively for offshore oil production, oil transportation by tankers, commercial shipping, commercial and recreational fishing, ecotourism, and military activities. The SCB also has a history of oil spills (Carter et al. 2000). These wildlife threats have prompted state and federal agencies to protect and monitor seabirds and marine mammals, and to establish marine reserves that facilitate these goals.

Breeding biology.-- Storm-petrels are sparrow-sized (39 g), long-lived (~30 yrs) species that exhibit

delayed first breeding and have low reproductive output (1 egg/yr). Their life history traits put them at risk for rapid population declines and slow recovery from habitat loss. In the Channel Islands, ashy storm-petrels nest in talus, rocky crevices of sea caves, and on steep, inaccessible cliffs (Hunt et al. 1979, Carter et al. 1992). Their breeding is less synchronous compared with other storm-petrels; pairs generally lay a single egg (Apr-Jul), but individual pairs may nest throughout the year. Incubation (42 to 59 d) and chick-rearing (72 to 119 d) are protracted relative to other seabirds; both parents provision their young at the nest site every 1-3 d (Ainley 1995). Unlike most storm-petrels, ashy storm-petrels are non-migratory and reside within the California Current System year round. Birds are patchily distributed at sea, and frequent waters along the continental slope (200 m -- 2000 m depth).

Population size.-- Hunt et al. (1979) estimated the Channel Islands population of ashy storm-petrels at <2000 birds; however, this estimate was not derived in a systematic survey. Carter et al. (1992) revised this estimate to 3,100 breeding birds in the Channel Islands on the basis of breeding island surveys. Recent estimates of densities and distribution are being analyzed from the USGS supported at-sea surveys conducted in 1999-2002 (Mason et al., unpubl. data). In the fall, ashy storm-petrels may occur in dense flocks (>5000 birds: Ainley 1995) concentrated in Monterey Bay, California (Roberson 2002). Other population estimates may be derived from capture-recapture surveys. Ashy storm-petrels were captured on several islands in 1991-1994 (H. R. Carter, unpubl. data), and on Santa Barbara Island (SBI) in 1994-1999 (Martin & Sydeman 1998, Wolf et al. 2000). Birds recaptured at SBI were marked at several other islands in CINP, suggesting movement among islands, including Santa Cruz Island where nesting studies have been conducted (McIver et al. 2002).

Diet.-- Little is known about the food habits of ashy storm-petrels (Ainley 1995). *O. homochroa* probably feeds at the surface on neustonic prey (e.g., euphausiids, decapod larvae, squid paralarvae, and larval fishes), but their use of these prey items has not been quantified. Their diet may include plastic particles, a recent concern in seabirds worldwide (Blight & Burger 1997, Vleitstra & Parga 2002). Ingestion of plastic may have a negative effect on survival; storm-petrels containing large amounts of plastic weighed significantly less than those with not as much plastic. In the SCB, neustonic mass of plastic at the surface was 2.5 times that of zooplankton (Moore et al. 2002); particles concentrated PCBs and DDE to 10^6-times ambient water concentrations (Mato et al. 2001); and, exceptionally high concentrations of DDE were found in ashy storm-petrels breeding on the Farallon Islands (Risebrough et al. 1968). Thus, food-sized plastic particles may ultimately serve as a transport medium for toxic chemicals in ashy storm-petrel diets.

Movements.— An important component of earlier USGS work developed radio telemetry techniques to measure distribution and movements of Cassin's Auklet (Adams et al. 2003) and Xantus's Murrelet (Whitworth et al. 2000, Hamilton et al., unpubl. data). Our proposed work would extend research to include ashy storm-petrel distribution, movements, and attendance patterns at principal CINP colonies. Our goal is to complement island monitoring and recommend at-sea surveys. This telemetry research will be the first of its kind involving any of the 21 storm-petrel species worldwide.

Integration.— Very little is know about critical foraging habitats and affects of fluctuating ocean conditions on seabirds nesting in the CINP, yet this information is critical for interpreting long-term CINP island-based monitoring efforts. Our previous studies in the SCB (Whitworth et al. 2000, Adams et al 2003, Hamilton et al. 2003) have shown distribution of zooplanktivorous seabirds correspond with ocean features concentrating larval-juvenile fishes and krill at shallow depths. Integration of storm-petrel monitoring activities (mist-netting, and sea-cave nest monitoring (McIver 2000, unpubl. data) with ocean-based habitat studies (radio-telemetry) and diet analyses will provide the basis for interpreting long-term monitoring on breeding colonies.

Procedures/methods

1. Summarize population status and recommend a monitoring strategy

We will summarize all existing capture-recapture data for ashy storm-petrels in the CINP (CINP unpubl. data, Carter et al. unpubl. data) augmented by two years of capture-recapture surveys at three colonies: Anacapa-Santa Cruz Islands, Prince Island, and Santa Barbara Island. We will obtain permits to access colonies and conduct capture-recapture surveys following standard methods (Ainley 1995, Sydeman et al. 1998). Net locations established earlier (CINP; Carter et al, unpubl. data) will be visited twice monthly from Apr-Aug. Birds will be captured at night with mistnets and vocalization playback, identified to species (Ashy, Leach's, Black), measured (bill length, tarsus length, wing chord, and mass), and banded. Birds with downy brood patches will be classified as nonbreeding, and a drop of blood will be collected to determine sex (Zoogen, Inc.,

Davis, CA).

Population analyses will be conducted with an open population method (program JOLLY; Seber 1982). Monthly and annual capture-recapture rates will be separately pooled to evaluate breeding and total population size (Sydeman et al. 1998). Models will be evaluated for goodness-of-fit and ranked with AIC techniques (Burnam & Anderson 2002). We will use discriminant function analyses on our known-sex birds to determine if we can separate males from females based on dimorphic morphometrics (Warham 1990). Sex determination will allow us to estimate sex-specific survival probabilities for more comprehensive population assessments.

2. Evaluate diet during the breeding season

Regurgitated stomach contents of birds captured in mistnets will be placed into plastic Whirl-Pak™ bags (Hahn 1998). Stomach samples will be weighed (±1.0 g) with a 10-g Avinet™ spring scale and preserved in 70% isopropyl alcohol for analyses (M. Gailbraith, UBC Ocean Sciences). Prey remains will be identified and sorted to lowest taxonomic level and classified into age-classes (e.g., larval, juvenile, or adult for euphausiids). Prey items and plastic particles within each sample will be enumerated, sorted, and weighed (± 0.0001 g). Cumulative prey curves will be plotted to determine if the sample size is sufficient (Hurtubia 1973; Adams et al., *unpubl. data*).

We will pool samples by islands and years and quantify prey into three relative measures of prey quantity (RMPQ): percent composition by number (%N) and by mass (%M), and percent frequency of occurrence (%F). RMPQ values will be used to calculate the geometric index of importance (GII, Assis 1996), and both values will be pooled by island and year. Mixed-model logistic regressions will test for differences in presence-absence of prey items by island and year. Diet diversity (H') will be estimated by converting H' to the number of unique items (Hurtubia 1973). Prey composition will be compared among islands and between years with a percent similarity index (PSI: Whitaker 1952) and co-occurrence of prey will be examined in individual meal-loads with an index of affinity (IA: Fager & McGowan 1963).

3. Describe island attendance patterns and at-sea distribution

We will attach <1.5 g, tail-mounted VHF radio transmitters to storm-petrels (n = 60) captured in mist-nets at three locations in the CINP: Anacapa-Santa Cruz Islands (n = 20); Prince Island (n = 20); and Santa Barbara Island (n = 20). We will relate attendance patterns to environmental conditions (i.e., moonlight, wind-speed, and season) and determine if breeding storm-petrels aggregate in specific oceanographic habitats with unique bathymetry and ocean features. We will deploy automatic datalogger systems to store information on the presence-absence of radio-marked birds at each capture site. Storm-petrels will be tracked by aircraft (CDFG in-kind support) during surveys flown three times weekly from April through July. Foraging ranges and areas will be presented overlaying features in geographic information systems. We will rely on an on-board IR pyrometer, remotely-sensed imagery, and bathymetric data to characterize marine habitats. Analyses will include matched-pairs logistic regression techniques (Compton et al. 2002, J. Adams et al., *unpubl. data*).

Expected results or products

We will integrate new information on distribution, abundance, and population trends of ashy storm-petrels. Our results will provide a strategy for improved population estimates (Jolly & Hampton 1997, Clark et al. 2003). We will provide coverages with distribution maps of our findings to include in the CINP GIS database, and a final report including the first quantitative data on their food-habits and marine habitat associations. The diet studies and assessment of plastic ingestion will provide new information on potential bioaccumulation of toxins. The study will help identify critical habitat and provide guidance for management efforts at sea (e.g., marine protected areas) and on colonies (e.g. vegetation and seabird nesting habitat restoration).

Technology/information transfer

We will provide quarterly electronic status reports for interested parties. A summary report and presentations will be provided for resource agencies including the CINP, USFWS, CDFG, MMS, and CINMS. Our research will generate both spatial and tabular data sets intended to be incorporated into park, regional, national databases and made publicly available. Upon completion, we will deliver to CINP complete and verified data including GIS data, reports, metadata, photos, and other supporting materials via CD-ROM (ISO 9660 format and 8.3 file names). We will ensure that data are stored and transferred accurately, secured from loss or damage,

and made available to CINP following current NPS and USGS guidelines (NPS 2002). We anticipate 2-4 peer-reviewed scientific papers.

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Work Schedule

Timeline (FY2004–FY2005)

	Month						
Task	MAR	APR	MAY	JUN	JUL	AUG	SEPT–FEB
Mist-netting		XX	XX	XX	XX	XX	
Radio-telemetry		XX	XX	XX	X		
Diet sampling		X	XX	XX	XX	XX	
Nest monitoring					X	X	
Data analysis & writing (Year 2)			X	X	X	XX	XXXXXX
Progress update memoranda (Year 1)		X			X		
Final summary report							Feb 2006

Personnel

Josh Adams, Contract Seabird Biologist-- Experience: marine bird, marine mammal, and marine ecological studies for 10 years in California, Hawaii, and Alaska; federal research for USFWS, NMFS, and USGS; research specialty in ecology of marine birds including survey techniques, population and reproductive monitoring, food habits, and telemetry applications; Project Leader for current studies (1999–2004) focused on the breeding biology, foraging ecology, and oceanographic habitats of marine birds in the Channel Islands and Southern California Bight. Education: M.S. in Marine Science 2004, Moss Landing Marine Laboratories & California State University San Francisco; BA 1993, University of California Santa Cruz; Thesis Honors in Biology. Selected Publications: Adams, J., J. Y. Takekawa, and H. R. Carter. *In revision.* Foraging distance and home range of Cassin's Auklets nesting at two colonies in the California Channel Islands. Adams, J., J. Y. Takekawa, and H. R. Carter. *In review.* Stable foraging areas and variable chick diets: insight to ocean variability and reproductive success of Cassin's auklet in the California Channel Islands, 1999–2001. Adams, J., J. Y. Takekawa, and H. R. Carter. *In prep.* Relating Cassin's auklets to oceanographic habitats: integrating radio-locations with static and dynamic habitat off southern California.

John Y. Takekawa, Research Wildlife Biologist-- Experience: federal research biologist in California for 15 years; research specialty ecology of migratory waterbirds with technical specialty in application of radio telemetry; studies focused on the Pacific Rim, CA, and SFB; Goals Project Focus Team co-chair, BCDC Subtidal Habitats panel, NOAA Airport Runways panel, established the USGS SFB Estuary Field Station located on SPB in 1995. Education: PhD 1987, Iowa State Univ., Ames, Iowa; Animal Ecology/Statistics minor, MS 1982, Univ. of Idaho, Moscow, ID;Wildlife Resources, BS 1979, Univ. of Wash., Seattle; Wildlife Science/Forestry. Selected Publications: **Takekawa, J. Y.**, N. Warnock, G. M. Martinelli, A. K. Miles, and D. C. Tsao. 2002. Waterbird use of bayland wetlands in the San Francisco Bay estuary: movements of long-billed dowitchers during the winter. Waterbirds 25: 93-105. Whitworth, D. L., **J. Y. Takekawa**, H. R. Carter, S. H. Newman, T. W. Keeney, and P. R. Kelly. 2000. At-sea distribution of Xantus' murrelets *Synthliboramphus hypoleucus* in the Southern California Bight, 1995-1997. Ibis 142: 268-279. Carter, H. R., D. L. Whitworth, **J. Y. Takekawa**, T. W. Keeney, and P. R. Kelly. 2000. At-sea threats to Xantus' murrelets (*Synthliborampus hypoleucus*) in the Southern California Bight. Pages 435-447 *in* D. R. Browne, K. L. Mitchell, and H. W. Chaney (eds.). Proceedings of the fifth Channel Islands symposium. U. S. Minerals Management Service. Camarillo, CA.

Park Cooperator:

Paige Martin, Seabird Biologist (Park Cooperator), Channel Islands National Park, 1901 Spinnaker Drive, Ventura, CA 93001; tel:805/658-5764, fax:805/568-5798, email:paige_martin@nps.gov

Duration of Project: 2 years
Start Date: March 2004
Finish Date: February 2006
In-kind Grants: USGS MMS Pacific OCS Region Science Support Program

N2219 (CHIS)

January 8, 2004

Dr. John Y. Takekawa
U. S. Geological Survey
Western Ecological Research Center
San Francisco Bay Estuary Field Station
Building 505, Azuar Drive & I Street
PO Box 2012
Vallejo, CA 94592

Dear Dr. Takekawa:

We are pleased to offer our agency's support for your proposed study "Ashy storm-petrels in the Channel Islands National Park; population status and ecology of the California Current's most vulnerable endemic seabird. We recognize that basic research involving the ecology, distribution and population size of ashy storm-petrels is desperately needed. This research will help the National Park Service (NPS) by providing data to support management decisions regarding unique and fragile resources in Channel Islands National Park.

The Channel Islands are recognized as critical nesting and roosting habitat for a number of seabird species. The park has implemented significant management programs in recent years to enhance the quality of the islands for seabirds. The eradication of non-native animals, particularly the recent elimination of black rats from Anacapa Island, have had particularly positive impacts for rare seabirds such as the Xantus's murrelet and Cassin's auklet. However, at this time, our knowledge of ashy storm-petrels on the park islands is insufficient to determine if there are management actions that should be taken to better protect or enhance this species.

The park's seabird biologist, Paige Martin, has a long history of collaboration with you and your associates. We foresee that continuing through this project. Additionally, the park will transport you and associated researchers on regularly scheduled park boats to the islands. You may also use housing on the park islands on a space-available basis at the same rate charged to NPS employees.

We have worked with and provided support for USGS during many past and continuing research efforts. Please let us know if there is any additional information that you may need to help achieve your research goals.

Sincerely,

/s/ Russell E. Galipeau, Jr.
Superintendent

Outreach and Education

Montrose Settlements Restoration Program
Restoration Project Idea Submittal Form

General Instructions: Please complete the form in the space provided. This information will be used to select and initially evaluate potential restoration projects. Information provided may be made available to the public and respondents are cautioned against including proprietary information. Additional information may be requested of potential projects selected for further evaluation. Completed forms should be **returned by March 19, 2003** to Pam Castens, Montrose Settlements Restoration Program, NOAA; 501 W. Ocean Boulevard, Suite 4470; Long Beach; CA 90802; or by sending a completed electronic file by e-mail to anne.hoecker@r1.fws.gov. An electronic file of this form is available at www.darcnw.noaa.gov/montrose.htm.

Respondent's Contact Information

Name: Jackie Jaakola, Director - Marine Mammal Care Center @ Ft. MacArthur
President - MAR3INE (Marine Animal Rescue, Rehab, & Release Into Natural Env.)

Address:
3601 S. Gaffey St. San Pedro, CA 90731

e-mail: web: www.mar3ine.org
jackjaak@aol.com

Telephone:
310-548-5677

Restoration Project Idea Information

Project Idea Name: "Marine Mammal Mysteries"??
Comprehensive Educational Outreach Program of Marine Mammal Care Center/FM

List the geographic location(s) where the project would be implemented:

Greater Los Angeles Area

If the project is outside the Southern California Bight, Los Angeles County, or Orange County, briefly explain how it would benefit injured resources and/or lost services (bald eagle, peregrine falcon, marine birds, recreational and subsistence fishing, and the habitat and resources upon which they depend) in the Southern California Bight.

List primary natural resource and/or members of the public that will benefit from the project:

General public and school groups of all ages

List secondary natural resources, if any, that will benefit from the project:

Greater Los Angeles area marine habitat through educatingthe public about the affects of pollution

Briefly describe the benefits to natural resources and/or public if the project is implemented.

The Marine Mammal Care Center at Ft. MacArthur has an extensive education program in cooperation with the adjacent Center for Marine Studies. In addition, MAR3INE (the Care Center's support arm) volunteers manage and run a humble Educational Outreach Program. By enhancing this Outreach Program, more students and members of the general public (some who do not have the resources for field trips) will be educated in issues affecting their local environment, the effects of pollution on that environment, solutions for controlling pollution, and how they can help preserve our Earth for their future. It will be taught to them by the very people who "make a difference."

Montrose Settlements Restoration Program
Restoration Project Idea Submittal Form

Underline the time period range before benefits would be measurable after project implementation.

0 to 3 years 3 to 5 years 5 to 10 years > 10 years

Underline the time period range that benefits would last after they became measurable (i.e., duration of benefits).:

> 50 years 30 to 50 years 10 to 30 years at least 5 to 10 years < 5 years

Briefly describe the key elements of the project (include construction, operation, and maintenance phases, as appropriate, and specify how success would be monitored).

With a base program already in place, the Educatonal Outreach Program will be enhanced by hiring two pt.-time educators with a background/training in education, science and/or marine science. They will train/coordinate the on-site docents and outreach volunteers and will be responsible for implementing the enhanced program. In addition, they will monitor/evaluate the effectiveness of the volunteer presentations.

The educators, along with the volunteers, will interface directly with the public at a variety of events including (but not limited to): schools, youth groups, community/civic groups and associations, beach clean-up activities, public/corporate/environmental fairs, and participation in events in con-junction with related environmental groups (i.e. lifeguards, animal control, aquariums and zoological parks).

The educators will develop and/or implement programs suitable for all age groups to teach them about marine ecosystems, pollution in the environment and responsible citizenship within those ecosystems along with information which incorporates all missions of MSRP. They will model many of their classes/ presentations after those taught/presented on-site at the Marine Mammal Care Center through the Center for Marine Studies.

Materials and supplies required for the program will be developed and/or purchased. A suitable vehicle to transport the volunteers, educators and display/program materials will be purchased.

The success of the extended Educational Outreach Program will be measured by tracking the number of students and members of the public reached on an annual basis and from feedback from teachers/parents and the children. Surveys and/or comment forms will be reviewed and evaluated.

Add a "X" at the end of the box below that best describes the project methodology.

Employs a proven technology with demonstrated success. X	Employs a proven technology in a new way with high potential for success based on success of other types of applications.	Employs an innovative technology with a high potential for success based on experimental trial.

Check below the factors/concerns that could affect the success of the project.

DDT and/or PCB contaminated food source	Other contaminants
Engineering challenge	Design and/or choice of materials
Human disturbance	Feral animals
Exotic invasive species	Predation
Access	Natural physical processes
Write in:	Write in:

Montrose Settlements Restoration Program
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Underline the implementation phases that will require measures to avoid environmental impacts. Construction Operation Maintenance None
Would the project result in a risk to public health and/or safety that would require measures to reduce risk? Yes [ ] No [X]

Provide estimated cost range below, if possible, for implementation of key elements of the restoration project (include construction, operation, maintenance, and monitoring phases, as appropriate).

Key Elements	Frequency	Cost Range Estimate ($)
2 pt. time educators (24 hrs. ea./wk.) $14/hr.	for 5 years	$175,000
vehicle (van) large enough to carry large educational displays	1 time	$30,000
educational/curricular materials & displays	for 5 years	$25,000
weatherproof educational graphic at Marine Mammal Care Center	1 time	$2,500
laptop computer w/ Power Point capabilities	1 time	$2,500
Power Point projector	1 time	$2,500
vehicle fuel and maintenance	for 5 years	$7,500
professional training of staff (conferences)	over 5 years	$4,000
phone bills	for 5 years	$3,000
Total Cost Estimate		$252,000

Note: Provide base costs for activities that will occur more than once.
Use the following cost range categories: < $5,000, $5,000 to $10,000; $10,000 - $30,000; $30,000 - $50,000; $50,000 - $100,000;$100,000 - $500,000; $500,000 - $1,000,000; $1,000,000 - $5,000,000; > $5,000,000

How often would maintenance be required? The costs reflected above will run the program for 5 years.
Does the project have another source or potential source of funding? Yes [X] No [ ] If yes, describe how MSRP restoration funds would be used. MSRP funds will be used to greatly expand and enhance the existing program.
List potential funding partners (if known): Toyota Motor Sales, USA provided the initial materials for existing program Foundation for Marine Animal Husbandry provides Director of Care Center for oversight of all of its programs The William C. Bannerman Foundation provides support of existing program
Would there be opportunities for volunteer involvement during the project? Check below. Yes, during implementation [X] Yes, during monitoring [X] No [ ]

Kate Faulkner Curricula Idea received 8-05-03
National Park Service
805-271-4848
Kate_Faulkner@nps.gov

Title: **Develop curricula and public presentation materials to expand the Channel Islands National Park and Marine Sanctuary's existing educational outreach to students in Ventura and Santa Barbara Counties**

Project Description:
Expand the park and sanctuary's environmental education program through partnerships with other agencies and institutions to teach school children and visitors about the fragile resources of the Channel Islands, the connections between people and these resources, and the restoration efforts underway to bring back naturally functioning ecosystems. The park and sanctuary currently have a very effective curriculum-based education program in Ventura and Santa Barbara Counties. However, this program is not able to meet all requests, much less consider serving new, targeted communities. These programs would strengthen environmental awareness in students in grades K–12 and build constituency among underserved populations. Outreach programs would emphasize reaching into the large local Hispanic community.

Proposed Projects

On behalf of the Palos Verdes Peninsula Land Conservancy and the Department of Recreation and Parks of the City of Los Angeles, we propose that the Montrose Settlement provide:

1. Supplemental funds for the construction of an Interpretive Center at the White Point Nature Preserve. This Center would serve as one of the major mechanisms to inform and engage the public throughout the program implementation, including displays, educational materials and interactive programs. An existing, historic building on the site would be converted to use as the Interpretive Center.

2. Funding for an on-site naturalist to provide educational programs.

- ***geographic location of project site***

  The White Point Nature Preserve is on the coast in San Pedro, located immediately inland of the White Point outfall through which the DDT reached the ocean. It is a 100-acre site that is currently being restored as a nature preserve. The site overlooks the kelp beds that were impacted by the contamination and provides an outstanding location for education regarding the DDT contamination and the restoration efforts.

- ***determination of how projects located outside the Southern California Bight benefit injured resources and/or lost services (bald eagle, peregrine falcon, marine birds, recreational and subsistence fishing, and the habitat and resources upon which they depend) in the Southern California Bight.***

  This project is located at the center of the Southern California Bight.

- ***degree of benefit to natural resources and/or the public if the project is implemented***

  This project would greatly benefit the public, by providing an easily accessed location where information would be available about the history of the DDT contamination, the impacts on wildlife, the remediation efforts, and perhaps most important, the lessons to be learned from it.

In addition, the project site contains coastal bluff habitat which supports raptors including peregrine falcons. The natural resources in place surrounding the Center support many components of coastal ecosystems affected by DDT contamination.

- ***lag time before project benefits are realized (e.g. 0-3 years, 3-5 years, 5-10 years, >10 years)***

  The benefits would be immediate once the Center is constructed. The time required for construction depends on a number of factors, but should be approximately 1-2 years from funding.

  Benefits from an educational program would be immediate. Walking tours and other programs could begin immediately.

- ***duration of benefits after they become measurable (e.g. >50 years, 30-50 years, 10-30 years, 5-10 years, <5 years)***

  The benefits of the Center will last forever. Generations of children and adults will have an opportunity to learn from the lessons of the past.

- ***description of key elements of the project (construction, operation, maintenance) and how success could be monitored/determined***

The key elements are:

  - Design – A design for the Center will need to be prepared by an architect and other design professionals. Interpretive materials will also have to be designed and fabricated by an education professional. The design of the Center and the interpretive materials would be monitored through regular consultation with the Restoration Settlement Program (RSP) for consistency with the goals of the program.

  - Construction – The construction of the building would be conducted by the project manager and communicated to the RSP through regular reports. These reports will include the accomplishment of established milestones.

  - Operation – The Center would be operated by the Palos Verdes Peninsula Land Conservancy (PVPLC) and the Department of Recreation and Parks of the City of Los Angeles, using the funding provided by the RSP for the naturalist, funds provided by the PVPLC, and other grant funds as available.

  - Maintenance – The Center would be maintained by the City of Los Angeles Department of Recreation and Parks.

- ***whether the method of project implementation has been tested before, and if so, whether it was successful elsewhere***

  Interpretive Centers are known to be successful at many locations. This location is particularly suitable for education programs regarding the history of the DDT contamination, and the surrounding area provides examples of ecosystems which have been affected by DDT contamination.

- ***how and whether performance could me measured***

  Regular reports would be submitted detailing the number of people served and the programs presented. The numbers of people served by the Interpretive Center would be a direct measure of the amount of outreach completed.

- ***whether any extenuating factors could affect the potential success of the project (e.g. DDT and/or PCB contaminated food resource, engineering challenges, exotic species, human disturbance, access).***

  No factors will negatively affect the success of this project.

- ***extent of environmental mitigation measures needed to avoid significant or unacceptable environmental impacts***

  All of the necessary environmental review for the project has been completed, and the EIR has been approved.

- ***whether the project resulted in an unacceptable risk to public health and safety that would require mitigation measures***

  There would be no risk to public health and safety.

- ***estimated costs for implementation, and whether any other potential sources of funding exist for the proposed project***

  - A very preliminary estimate for the cost of converting the existing building to an Interpretive Center would be $500,000. More than $200,000 is already available from an existing grant for the construction of a "Restroom and Visitor Orientation Facility." Opportunities for collaboration exist in areas such as historic preservation grants or port mitigation money.

    We estimate that the amount needed from the MSRP would be between $100,000 and $300,000, depending on the design and other

funding partners. This would make the Interpretative Center a very cost effective project.

- An endowment of approximately $300,000 would provide a naturalist in perpetuity for the site.

- ***extent of maintenance requirements***

  Maintenance of the building would be provided by the City of Los Angeles Department of Recreation and Parks.

- ***whether any other project partners exist to share in implementation or maintenance responsibilities***

  The Palos Verdes Peninsula Land Conservancy will take the lead in managing this project. Other partners include the City of Los Angeles, the Fort MacArthur Military Museum Association, the White Point Nature Preserve Advisory Board, and the San Pedro Coastal Neighborhood Council.

- ***any potential opportunities for volunteer or community involvement in the project***

  There are significant opportunities for volunteer and community involvement. The PVPLC holds volunteer days every Saturday to assist with the ongoing habitat restoration efforts. The groups involved already would undoubtedly continue their involvement with the project, and we would expect more to participate in the future. A partial list includes:

  San Pedro Girl Scouts & Brownies
  San Pedro High School Environmental Club
  San Pedro High School students
  El Camino College students
  Habitat for Humanity
  Tree People
  Audubon YES!
  Narbonne High School Key Club
  San Pedro High School Key Club
  Palos Verdes Peninsula High School Environmental Club
  Boy Scouts
  Kiwanis Club
  Mary Star of the Sea High School students
  Dana Middle School students
  Azuza Pacific College students
  Friends of White Point
  Sierra Club
  San Pedro Rotary Club

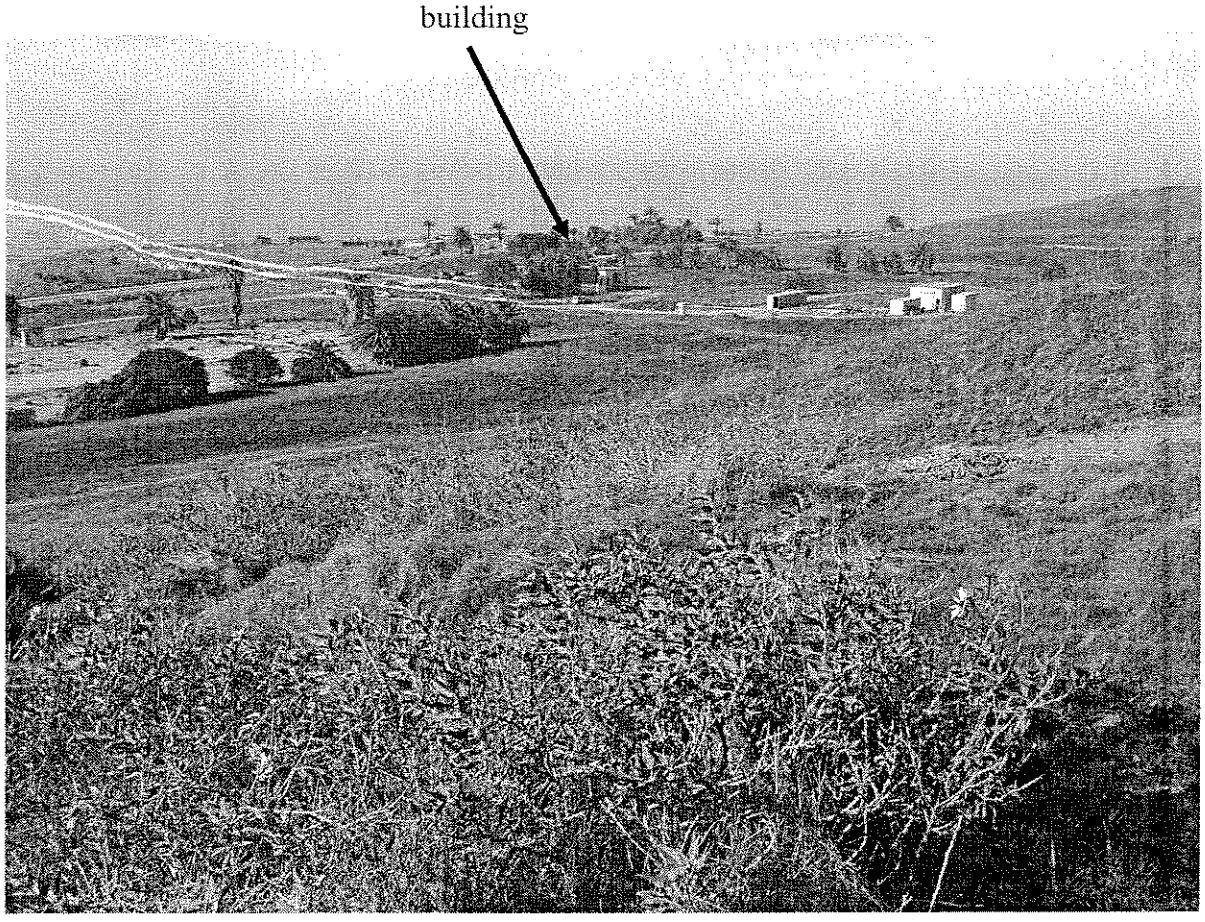
Thank you for your consideration.

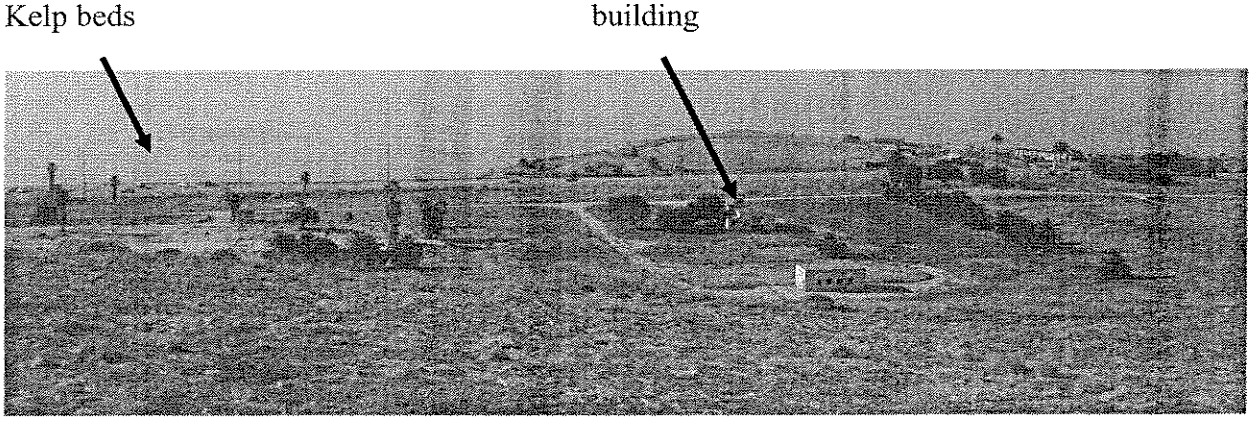
Contact information is as follows:

Barbara Dye, Executive Director
Andrea Vona, White Point Project Manager
Palos Verdes Peninsula Land Conservancy
916 Silver Spur Road, Suite 108
Rolling Hills Estates, CA 90274

310-541-7613
bdye@pvplc.org; avona@pvplc.org

WHITE POINT NATURE PRESERVE





Montrose Settlements Restoration Program
Restoration Project Idea Submittal Form

General Instructions: Please complete the form in the space provided. This information will be used to select and initially evaluate potential restoration projects. Information provided may be made available to the public and respondents are cautioned against including proprietary information. Additional information may be requested of potential projects selected for further evaluation. Completed forms should be **returned by March 19, 2003** to Pam Castens, Montrose Settlements Restoration Program, NOAA; 501 W. Ocean Boulevard, Suite 4470; Long Beach; CA 90802; or by sending a completed electronic file by e-mail to anne_hoecker@r1.fws.gov. An electronic file of this form is available at www.darcnw.noaa.gov/montrose.htm.

Respondent's Contact Information

Name:	Center for Marine Studies at Fort MacArthur c/o Fort MacArthur Education Foundation		
Address:	3601 South Gaffey Street, San Pedro, CA 90731		
e-mail:	jmauch@ lausd.k12 .ca.us	Telephone:	310.547.9888

Restoration Project Idea Information

Project Idea Name: Protecting Our Wildlife
Public Education Designed to Lessen Impact on Marine Wildlife

List the geographic location(s) where the project would be implemented:

To Schools located in the Los Angeles River Watershed or Los Angeles County

If the project is outside the Southern California Bight, Los Angeles County, or Orange County, briefly explain how it would benefit injured resources and/or lost services (bald eagle, peregrine falcon, marine birds, recreational and subsistence fishing, and the habitat and resources upon which they depend) in the Southern California Bight.

List primary natural resource and/or members of the public that will benefit from the project:
Fourth or fifth grade students that are to be taught how human activity affects local marine wildlife, primarily marine birds and pinnipeds, culminating in visiting the animal rehabilitation hospitals in San Pedro.

List secondary natural resources, if any, that will benefit from the project:
The project will affect human behavior toward watershed and offshore marine habitat health. It will incorporate the goals of the Federal Clean Water Act, improving beach cleanliness, and lessening adversarial fisheries-wildlife interaction. Personal action and responsibility will be a key concept.

Briefly describe the benefits to natural resources and/or public if the project is implemented.

The program goal is to change the behavior or area residents in order to protect marine resources. This program will use the animal rehabilitation hospitals of Fort MacArthur to instill in students with the desire to become stewards of the environment and to lessen the impact of humans on wildlife. The program potentially can serve 9000 students and their teachers , providing them with an instructional package that emphasizes rigorous science content while reinforcing literacy skills. Participants will learn that their actions do have meaning in the natural environment. Additionally, students will transmit their knowledge to their homes and to the community. Targeting school populations with direct contact with the Los Angeles River/ San Gabriel River Watershed will have a direct impact on the overall ecological health of our community. The program emphasize not only what coastal dwellers can do to improve environmental conditions, but also how residents living inland can affect health. Clean waterways and oceans provide all of the area's residents with a natural resource to be used by all.

Montrose Settlements Restoration Program
Restoration Project Idea Submittal Form

Underline the time period range before benefits would be measurable after project implementation.

0 to 3 years 3 to 5 years 5 to 10 years > 10 years

Underline the time period range that benefits would last after they became measurable (i.e., duration of benefits).:

> 50 years 30 to 50 years 10 to 30 years 5 to 10 years < 5 years

Briefly describe the key elements of the project (include construction, operation, and maintenance phases, as appropriate, and specify how success would be monitored).

The goal of this program is to instill attitudes in students that become part of their lifelong pattern of understanding and behavior toward the environment, forming an increasingly proactive public. The education project would take place at the Center for Marine Studies at Fort MacArthur as well as at individual schools. The facility is the educational component to the Marine Mammal Care Center and the Los Angeles Oiled Bird Center. Each student group would participate in a 3-hour onsite program in which they would learn more about the animals they had been studying at school. The hospital visitations would include reinforcement lessons in the student laboratories. Activities would continue when the students return to their home school. Lessons will meet the objectives of state and federal standards for their grade level.

Funds required for this project will be used to provide transportation for students to the Center for Marine Studies, student/teacher curricular support materials, and laboratory supplies. There will be, therefore, no construction phase. The Center is capable of implementing this program within 45 days of funding. The core curriculum has already been developed. Additional material will be written to further emphasize the program's theme. Success of this program will be monitored by survey including pre- and post-visit questionnaires for students and teachers.

The Center for Marine Studies is an experienced provider of field science educational experiences and has strong collaborative partnerships with other environmental education resources in Los Angeles: the Cabrillo Marine Aquarium, the Los Angeles River School and the Friends of the LA River, the City of Los Angeles Stormwater Management Division, the State of California Oil Spill Prevention Response Network, the National Marine Fisheries Marine Mammal Stranding Network, University of California Los Angeles Marine Science Teacher Training Program, the Globe Marine program, and the Center for Ocean Science Education Excellence (COSEE-WEST), a grantee of the National Science Foundation. Support material from these programs will be integrated into the curriculum for students.

Add a "X" at the end of the box below that best describes the project methodology.

Employs a proven technology with demonstrated success.	Employs a proven technology in a new way with high potential for success based on success of other types of applications.	Employs an innovative technology with a high potential for success based on experimental trial.
X		

Check below the factors/concerns that could affect the success of the project.

DDT and/or PCB contaminated food source	Other contaminants
Engineering challenge	Design and/or choice of materials
Human disturbance	Feral animals
Exotic invasive species	Predation
Access student access prohibited during oil spill	Natural physical processes
Write in: teacher training required	Write in:

Montrose Settlements Restoration Program
Restoration Project Idea Submittal Form

Underline the implementation phases that will require measures to avoid environmental impacts.
Construction Operation Maintenance None

Would the project result in a risk to public health and/or safety that would require measures to reduce risk? Yes [ ] No [X]

Provide estimated cost range below, if possible, for implementation of key elements of the restoration project (include construction, operation, maintenance, and monitoring phases, as appropriate).

Key Elements	Frequency	Cost Range Estimate ($)
Year One: Transportation @ $200 per bus	150	$30,000
Curricular Support @ $25	150	3,750
Laboratory, Office Support		1,250
Cost per trip $235 Cost per pupil $4.00		
Total Cost Estimate	$35,000	

Note: Provide base costs for activities that will occur more than once.
Use the following cost range categories: < $5,000; $5,000 to $10,000; $10,000 - $30,000; $30,000 - $50,000; $50,000 - $100,000; $100,000 - $500,000; $500,000 - $1,000,000; $1,000,000 - $5,000,000; > $5,000,000

How often would maintenance be required?
not applicable

Does the project have another source or potential source of funding? Yes [ ] No [X]
If yes, describe how MSRP restoration funds would be used.

List potential funding partners (if known):
In kind donations from the Los Angeles Unified School, The Marine Mammal Care Center, and the Los Angeles Oiled Bird Center

Would there be opportunities for volunteer involvement during the project? Check below.
Yes, during implementation [X] Yes, during monitoring [ ] No [ ]

Montrose Settlements Restoration Program
Restoration Project Idea Submittal Form

General Instructions: Please complete the form in the space provided. This information will be used to select and initially evaluate potential restoration projects. Information provided may be made available to the public and respondents are cautioned against including proprietary information. Additional information may be requested of potential projects selected for further evaluation. Completed forms should be **returned by March 19, 2003** to Pam Castens, Montrose Settlements Restoration Program, NOAA; 501 W. Ocean Boulevard, Suite 4470; Long Beach; CA 90802; or by sending a completed electronic file by e-mail to anne_hoecker@r1.fws.gov. An electronic file of this form is available at www.darcnw.noaa.gov/montrose.htm.

Respondent's Contact Information

Name:	Hostelling International in partnership with Center for Marine Studies at Fort MacArthur c/o Fort MacArthur Education Foundation
Address:	3601 South Gaffey Street, San Pedro, CA 90731
e-mail: jmauch@ lausd.k12 .ca.us	Telephone: 310.547.9888

Restoration Project Idea Information

Project Idea Name:
Marine Science at Fort MacArthur
Intensive Marine Science Program to Lessen Human Impact on the Environment

List the geographic location(s) where the project would be implemented:

Schools located in the Los Angeles River or San Gabriel River Watersheds

If the project is outside the Southern California Bight, Los Angeles County, or Orange County, briefly explain how it would benefit injured resources and/or lost services (bald eagle, peregrine falcon, marine birds, recreational and subsistence fishing, and the habitat and resources upon which they depend) in the Southern California Bight.

List primary natural resource and/or members of the public that will benefit from the project:
Sixth grade students will be taught how the health of the ocean and its animals are influenced.
By learning monitoring protocols,they will understand how to lessen human impact on watersheds.

List secondary natural resources, if any, that will benefit from the project:

The project through its education component will affect human behavior toward the watershed and coastal marine habitat. Resultant changes will develop personal action and responsibility.

Briefly describe the benefits to natural resources and/or public if the project is implemented.

The goal is to change behavior of area residents in order to protect watershed and marine resources. The program has the potential of serving 1200 students and their teachers, providing them with an intensive marine science instructional package that is based on rigorous science content, stressing math and literacy skills. Participants will learn that their actions do have meaning even though they may live some distance from the ocean. Targeting schools with close contact with the Los Angeles or San Gabriel River watersheds will have direct impact on the health of these resources. As students transmit their knowledge to homes and community, they will become more proactive in protecting the health of their natural resources and in lessening adverse impact of humans on the local environment. The program will emphasize achieving the goals of the Federal Clean Water Act, the Marine Mammal Protection Act, and the Endangered Species Act. Stress will be placed on reducing adverse human-fisheries incidents and in improving overall environmental cleanliness through personal responsibility.

Montrose Settlements Restoration Program
Restoration Project Idea Submittal Form

Underline the time period range before benefits would be measurable after project implementation.

0 to 3 years 3 to 5 years 5 to 10 years > 10 years

Underline the time period range that benefits would last after they became measurable (i.e., duration of benefits).:

> 50 years 30 to 50 years 10 to 30 years 5 to 10 years < 5 years

Briefly describe the key elements of the project (include construction, operation, and maintenance phases, as appropriate, and specify how success would be monitored).

The goal of this program is to instill attitudes in students that become part of a lifelong pattern of their understanding of the complexity and interrelationships of the environment. By changing behavior an increasingly proactive public will become interested in fostering stewardship toward the health of the marine community.

The education project will take place at the Center for Marine Studies at Fort MacArthur, the Marine Mammal Care Center , the Los Angeles Oiled Bird Center, Cabrillo Marine Aquarium, Royal Palms State Beach, and Los Angeles Harbor. Each student group would participate in a 3 day, 2 night intensive program in which they would learn about the impact of the physical environment on animals found in near shore communities. In addition to learning about animals that are being cared for in the two rehabilitation hospitals, students will receive instruction on how human behavioral changes can protect environmental health. Students will conduct environmental monitoring protocols and contribute to data records. Electronic communication will link schools that are participating. Prior to their arrival, teachers will be given training with pre-visit activities for the students, stressing strong literacy skills in mathematics and written expression.

The program will serve thirty groups of 40 participants. Groups will be from schools within the Los Angeles or San Gabriel River Watersheds, targeting especially under represented communities. Funds for this project will be used to provide program costs and will include transportation, teacher training, student/teacher curricular support materials, laboratory supplies, and student overnight residency requirements. The infrastructure for this program is in place so there would be no construction phase in this project. The Center is capable of implementing this program within 45 days of fund availability. The core curriculum for this project is already developed. Supplemental material emphasizing the program themes is readily available. Success of the program would be monitored by survey including pre- and post-visit questionnaires for participants.

The Center for Marine Studies and its partner, Hostelling International, are experienced providers of overnight, intensive field science educational experiences. These organizations have strong collaborative partnerships with other environmental education resources: the Cabrillo Marine Aquarium, the Friends of the L.A. River, the City of Los Angeles Stormwater Management, the State of Calif. Oil Spill Prevention Network, the National Marine Fisheries, and the Center for Ocean Science Education Excellence, a grantee of the National Science Foundation.

Add a "X" at the end of the box below that best describes the project methodology.

Employs a proven technology with demonstrated success. X	Employs a proven technology in a new way with high potential for success based on success of other types of applications.	Employs an innovative technology with a high potential for success based on experimental trial.

Check below the factors/concerns that could affect the success of the project.

DDT and/or PCB contaminated food source	Other contaminants
Engineering challenge	Design and/or choice of materials
Human disturbance	Feral animals
Exotic invasive species	Predation
Access	Natural physical processes
Write in: student access denied during oil spill	Write in: teacher training required

Montrose Settlements Restoration Program
Restoration Project Idea Submittal Form

Underline the implementation phases that will require measures to avoid environmental impacts. Construction Operation Maintenance None
Would the project result in a risk to public health and/or safety that would require measures to reduce risk? Yes [ ] No [x]

Provide estimated cost range below, if possible, for implementation of key elements of the restoration project (include construction, operation, maintenance, and monitoring phases, as appropriate).

Key Elements	Frequency	Cost Range Estimate ($)
Transportation@ $200.00 per bus per day	90	$18,000
Curricular Support Materials @ $95.00 per group	30	2,850
Laboratory, office support		3,000
Cabrillo Aquarium Program @ $225.00 per group	30	6,750
Sea Education Afloat @ 400 per trip	30	12,000
Residence Expense @ $4000 per group	30	120,000
Cost per Group $5420; cost per participant $135.50 based on group size of 40		
Funds held and administered by Hostelling International, and nonprofit 501c3 organization		
Total Cost Estimate	$162,600.00	

Note: Provide base costs for activities that will occur more than once.
Use the following cost range categories: < $5,000, $5,000 to $10,000; $10,000 - $30,000; $30,000 - $50,000; $50,000 - $100,000;$100,000 - $500,000; $500,000 - $1,000,000; $1,000,000 - $5,000,000; > $5,000,000

How often would maintenance be required? not applicable
Does the project have another source or potential source of funding? Yes [ ] No [x] If yes, describe how MSRP restoration funds would be used.
List potential funding partners (if known): In kind donations from the Los Angeles Unified School District, the Marine Mammal Care Center, and the Los Angeles Oiled Bird Center
Would there be opportunities for volunteer involvement during the project? Check below. Yes, during implementation [x] Yes, during monitoring [ ] No [ ]

Montrose Restoration Project Idea

Interdisciplinary Curriculum Guide for Middle School Grades

Submitted by: Samantha Whalen, Outreach and Education Coordinator, MSRP

Contact Information: 562-434-9601, samanthawhalen@hotmail.com

Other Points of Contact: Vicki Wawerchak, Heal the Bay
310-393-6149 x107, vwawerchak@healthebay.org

Lisa Pelstring, NOAA
301-713-3038 x195, lisa.pelstring@noaa.gov

Description of project:

1. The purpose of this project is to develop an interdisciplinary curriculum/activity guide for middle school grade levels to be used on field trips to local informal education venues and in the classroom. The theme of the guide will focus on the connection of humans to the natural resources that exist in their local environment.
2. The second element of the project is to train local conservation corps members to visit and present to school groups before and/or after their field trip or on-site visit.

Geographic location:

1. The activities in the guide will be focused on the various ecosystems of Southern California and the natural resources that inhabit those ecosystems.
2. The guide will be used at various locations in Southern California, including coastal aquariums, the International Bird Rescue Research Center, the Marine Mammal Care Center, the Palos Verdes Land Conservancy, the National Park Service, and the Catalina Island Conservancy. All of these organizations service schools in Ventura, Los Angeles, and Orange county.

Degree of Benefit:

By forming partnerships with various organizations, this project will significantly benefit thousands of students and local residents of Southern California every year by providing information about the history of environmental pollution, such as DDT contamination, the impact on our natural resources, the remediation efforts being made to relieve those impacts, the lessons learned from our past mistakes, and the ways in which everyone can help.

Lag time before benefits are realized:

The time required for the development of a curriculum guide is estimated to be between 18 and 24 months. Once the guide has been written, edited, and field tested and implementation begins, the benefit will be recognized immediately as students begin to learn about and appreciate our natural resources.

Duration of Benefits:

The benefit of children and adults learning about our natural resources and how they provide for humans will last a lifetime. This knowledge will be shared through generations as lessons are learned from the past and decisions about our natural resources are made in the future.

Description of key elements: (construction, operation, and maintenance)

Design/construction-

The development of the curriculum guide will be done through an advisory committee made up of representatives from local educational establishments. Once the advisory committee is established, each representative will contribute their time and ideas for activities in the guide. These partners will also edit and field test all activities in the guide.

Operation:

The curriculum guide will be used by all contributing partners at their respective locations as well as by teachers and conservation corps naturalists. Once the guide is developed, published, and distributed, it will be the responsibility of the partners to make use of it regularly. The conservation corps members will be trained on specific activities and presentations that they can demonstrate in a middle school classroom. They will continuously operate this program as long as it is in place with the contributing partners.

Maintenance:

The maintenance of the program would be the responsibility of the contributing partners, MSRP, and the LA/LB conservation corps. Maintenance requirements will include teacher workshops, printing of materials, training of conservation corps members, and quarterly reports submitted by all contributing partners and MSRP.

Success of the curriculum guide and educational program will be monitored through quarterly reports, on-site visits, and will be determined by the number of schoolchildren serviced and attendee surveys.

Project implementation tested before:

Environmental Education programs and curriculum have proven to be extremely successful in teaching children about the importance and benefit of a healthy ecosystem and natural resources. Many similar educational programs have allowed children to develop problem solving skills and gain an appreciation of their surrounding environment. Programs such as Project Wild, Project Learning Tree, and Wet in the City have reached millions of students across the country and have received financial support from both federal and private organizations. This middle school curriculum guide will be modeled after a program titled "Key to the Sea", which has been in place for over five years and reached thousands of students and educators across Los Angeles County.

How performance is measured:

Quarterly reports would be submitted detailing the number of students serviced and the programs represented. Attitude and behavioral surveys could be administered to students to measure changes between pre/post field trips and lessons.

Factors affecting potential success:

No extenuating factors will affect the success of this project.

Estimated costs for implementation:

The total program budget includes the development of the program, materials needed for the program, and personnel costs for implementation of the program. Start-up costs would range from $150,000-$200,000, and an annual budget of $75,000-$100,000 would be sufficient to maintain the program. Ideally, the program would run between seven to ten years with support from MSRP and include time for development, implementation, and evaluation. A total budget of approximately $750,000-$1,000,000 over a ten year period would be required to successfully manage an educational program of this kind. Since this type of education program has the potential to reach over a million students and teachers over ten years, the cost effectiveness of this program can be considered extremely efficient and successful.

Extent of Maintenance Requirements:

An annual budget would need to be developed to cover printing costs, workshop expenses, and conservation corps worker fees. After successful implementation of this program, additional funding sources could be obtained through grants and community partnerships. Fee-based programs could also cover expenses of program.

Other Potential Sources of Funding:

There are numerous potential funding sources for this type of educational project through grants and partnerships. Some of these sources may include governmental agencies such as EPA, NSF. and USFWS, or non-governmental agencies such as NWF, NAAEE, Heal the Bay, and other community sources such as LA County Dept. of Education, school districts.

Project Partners to share in implementation:

- Montrose Settlements Restoration Program
- Heal the Bay
- Cabrillo Aquarium
- International Bird Rescue Research Center
- Marine Mammal Care Center
- Long Beach Aquarium of the Pacific
- National Park Service
- Palos Verdes Land Conservancy
- Catalina Island Conservancy
- Roundhouse Marine Studies Lab
- SEA Lab
- USC Sea Grant

Opportunities for volunteer/community involvement:

All of the contributing partners have a strong group of volunteers working on-site that interact with schoolchildren and visitors. Volunteers and community representatives could assist in the development and design of the environmental curriculum.